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A Scientific Adventure Novelette
By JOHN W. CAMPBELL, JR.

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By OTIS ADELBERT KLINE

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By PAUL ERNST

STRANGER THAN TRUTH

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IN TEN YEARS

Remington *NOISELESS* Portable

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MONEY-BACK GUARANTEE
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10-DAY FREE TRIAL. Now for the first time in history you can own a real Remington NOISELESS Portable for only 10¢ a day or $3 a month. Think of it! The finest Remington Portable ever built at the lowest terms we have ever offered. Every attachment needed for complete writing equipment—PLUS THE FAMOUS NOISELESS FEATURE. Brand new. Not rebuilt. Send coupon today.

WE PAY ALL SHIPPING CHARGES. You don't risk a penny. We send this Remington Noiseless Portable direct from factory to you with TEN DAYS' FREE TRIAL. If you are not satisfied, send it back.

FREE →
TYPING COURSE

With your New Remington Noiseless Portable we will send you—absolutely FREE—a 19-page course in typing. It teaches the Touch System, used by all expert typists. It is simply written and completely illustrated. Instructions are as simple as A, B, C. Even a child can easily understand this method. A little study and the average person, child or adult, becomes fascinated. Follow this course during the 10-Day Trial Period we give you with your typewriter and you will wonder why you ever took the trouble to write letters by hand.

FACTORY TO YOU

The gem of all portables. Imagine a machine that speaks in a whisper . . that removes all limitations of time or place. You can write in a library, a sick room, a Pullman berth without the slightest fear of disturbing others. And in addition to quiet, a superb performance literally makes the words seem to flow from the machine. Equipped with all attachments that make for complete writing equipment, the Remington Noiseless Portable produces manifolding and stencil cutting of truly exceptional character. Furnished in black with shining chromium attachments.

SPECIFICATIONS. Standard Keyboard. Finished in glistening black with chromium attachments. Takes paper 9.5 inches wide. Writes lines 8.2 inches wide. Standard size, 12 yard ribbon. Makes up to 7 clear legible carbons. Back spacer. Full size platen. Paper fingers, roller type. Black key cards with white letters. Double shift key and shift lock. Right and left carriage release. Right and left cylinder knobs. Large cushion rubber feet. Single or double space adjustment. All the modern features plus NOISELESS operation.

MONEY-MAKING OPPORTUNITIES OPEN. Hundreds of jobs are waiting for people who can type. A typewriter helps you put your ideas on paper in logical, impressive form . . . helps you write clear, understandable sales reports, letters, articles, stories. A Remington Portable has started many a young man and woman on the road to success.

A GIFT FOR ALL THE FAMILY. If you want a gift for birthday, Christmas or Graduation . . . one Father, Mother, Sister or Brother will use and appreciate for years to come . . . give a Remington Noiseless Portable. We will send a Remington Noiseless Portable to anyone you name, and you can still pay for it at only 10c a day. Few gifts are so universally pleasing as a new Remington Noiseless Portable. Write today.

Mail Now!

Remington Rand Inc., Dept. 169-8
315 4th Avenue, New York, N. Y.
Please tell me how I can get a new Remington Noiseless Portable typewriter, plus FREE typing course and carrying case, for only 10c a day. Also send me new illustrated catalogue.

Name_____

Address_____

City_____ State_____

FREE CARRYING CASE

Also under this new Purchase Plan we will send you FREE with every Remington Noiseless Portable a special carrying case sturdily built of 3-ply wood. This handsome case is covered with heavy du Pont fabric. The top is removed by one motion, leaving the machine attached to the base. This makes it easy to use your Remington anywhere—on knees, in chairs, on trains. Don't delay . . . send in the coupon for complete details!

A Money-Making Opportunity

for Men of Character

EXCLUSIVE FRANCHISE FOR

AN INVENTION EXPECTED TO REPLACE A MULTI-MILLION-DOLLAR INDUSTRY

Costly Work Formerly "Sent Out" by Business Men Now Done by Themselves at a Fraction of the Expense

This is a call for men everywhere to handle exclusive agency for one of the most unique business inventions of the day.

Forty years ago the horse and buggy business was supreme—today almost extinct. Twenty years ago the phonograph industry ran into many millions—today practically a relic. Only a comparatively few foresighted men saw the fortunes ahead in the automobile and the radio. Yet irresistible waves of public buying swept these men to fortune, and sent the buggy and the phonograph into the discard. So are great successes made by men able to detect the shift in public favor from one industry to another.

Now another change is taking place. An old established industry—an integral and important part of the nation's structure—in which millions of dollars change hands every year—is in thousands of cases being replaced by a truly astonishing, simple invention which does the work better—more reliably—AND AT A COST OFTEN AS LOW AS 2% OF WHAT IS ORDINARILY PAID! It has not required very long for men who have taken over the rights to this valuable invention to do a remarkable business, and show earnings which in these times are almost unheard of for the average man.

EARNINGS

One man in California earned over $1,600 per month for three months—close to $5,000 in 90 days' time. Another writes from Delaware—"Since I have been operating (just a little less than a month of actual selling) and not the full day at that, because I have been getting organized and had to spend at least half the day in the office; counting what I have sold outright and on trial, I have made just a little in excess of one thousand dollars profit for one month." A Connecticut man writes he has made $55.00 in a single day's time. Texas man nets over $300 in less than a week's time. Space does not permit mentioning here more than these few random cases. However, they are sufficient to indicate that the worthwhile future in this business is coupled with immediate earnings for the right kind of man. One man with us has already made over a thousand sales on which his earnings ran from $5 to $60 per sale and more. A great deal of this business was repeat business. Yet he had never done anything like this before coming with us. That is the kind of opportunity this business offers. The fact that this business has attracted to it such business men as former bankers, executives of businesses—men who demand only the highest type of opportunity and income—gives a fairly good picture of the kind of business this is. Our door is open, however, to the young man looking for the right field in which to make his start and develop his future.

Not a "Gadget"— Not a "Knick-Knack"—

but a valuable, proved device which has been sold successfully by business novices as well as seasoned veterans.

Make no mistake—this is no novelty—no flimsy creation which the inventor hopes to put on the market. You probably have seen nothing like it yet—perhaps never dreamed of the existence of such a device—yet it has already been used by corporations of outstanding prominence—by dealers of great corporations—by their branches—by doctors, newspapers, publishers—schools—hospitals, etc., etc., and by thousands of small business men. You don't have to convince a man that he should use an electric bulb to light his office instead of a gas lamp. Nor do you have to sell the same business man the idea that some day he may need something like this invention. The need is already there—the money is usually being spent right at that very moment—and the desirability of saving the greatest part of this expense is obvious immediately.

Some of the Savings You Can Show

You walk into an office and put down before your prospect a letter from a sales organization showing that they did work in their own office for $11 which formerly could have cost them over $200. A building supply corporation pays one man $70, whereas the bill could have been for $1,600! An automobile dealer pays our representative $15, whereas the expense could have been over $1,000. A department store has expense of $88.60, possible cost if done outside the business being well over $2,000. And so on. We could not possibly list all cases here. These are just a few of the many actual cases which we place in your hands to work with. Practically every line of business and every section of the country is represented by these field reports which hammer across dazzling, convincing money-saving opportunities which hardly any business man can fail to understand.

Profits Typical of the Young, Growing Industry

Going into this business is not like selling something offered in every grocery, drug or department store. For instance, when you take a $7.50 order, $5.83 can be your share. On $1,500 worth of business, your share can be $1,167.00. The very least you get as your part of every dollar's worth of business you do is 67 cents—on ten dollars' worth $6.70, on a hundred dollars' worth $67.00—in other words two thirds of every order you get is yours. Not only on the first order—but on repeat orders—and you have the opportunity of earning an even larger percentage.

This Business Has Nothing to Do With House to House Canvassing

Nor do you have to know anything about high-pressure selling. "Selling" is unnecessary in the ordinary sense of the word. Instead of hammering away at the customer and trying to "force" a sale, you make a dignified, business-like call, leave the installation—whatever size the customer says he will accept—at our risk, let the customer sell himself after the device is in and working. This does away with the need for pressure on the customer—it eliminates the handicap of trying to get the money before the customer has really convinced himself 100%. You simply tell what you offer, showing proof of success in that customer's particular line of business. Then leave the invention without a dollar down. It starts working at once. In a few short days, the installation should actually produce enough cash money to pay for the deal, with profits above the investment coming in at the same time. You then call back, collect your money. Nothing is so convincing as our offer to let results speak for themselves without risk to the customer! While others fail to get even a hearing, our men are making sales running into the hundreds. They have received the attention of the largest firms in the country, and sold to the smallest businesses by the thousands.

No Money Need Be Risked

in trying this business out. You can measure the possibilities and not be out a dollar. *If you are looking for a business that is not overcrowded*—a business that is just coming into its own—on the upgrade, instead of the downgrade—a business that offers the buyer relief from a burdensome, but unavoidable expense—a business that has a prospect practically in every office, store, or factory into which you can set foot—regardless of size—*that is a necessity* but does not have any price cutting to contend with as other necessities do—that because you control the sales in exclusive territory is your own business—*that pays more on some individual sales than many men make in a week and sometimes in a month's time*—if such a business looks as if it is worth investigating, *get in touch with us at once* for the rights in your territory—don't delay—because the chances are that if you do wait, someone else will have written to us in the meantime—and if it turns out that you were the better man—we'd both be sorry. So for convenience, *use the coupon below*—but send it right away—or wire if you wish. But do it now. *Address*

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Dept. 4047H, Mobile, Ala.

RUSH FOR EXCLUSIVE TERRITORY PROPOSITION

F. E. ARMSTRONG, Pres., Dept. 4047H, Mobile, Ala.
Without obligation to me, send me full information on your proposition.

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Street or Route .....

Box No. .....

City .....

State .....

THRILLING WONDER STORIES

The Magazine of Prophetic Fiction

VOL. 10 No. 1

August, 1937

IN THE NEXT ISSUE

THE IMMORTALITY-SEEKERS
A Novelette of the Fireless World
By JOHN W. CAMPBELL, JR.

A COMET PASSES
An Astronomical Novelette
By EANDO BINDER

THE HOTHOUSE PLANET
A Novelette of Scientific Exploration
By ARTHUR K. BARNES

THE CAVERN OF THE SHINING POOL
An Adventure in Relativity
By ARTHUR LEO ZAGAT

—plus a brand-new "Tubby" Story by RAY CUMMINGS and Many Others.

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● ON THE COVER

Penton and Blake, exiled from Earth, attack the strange shieath of Ganymede with an ingenious scientific device. This painting depicts a scene in John W. Campbell's novelette, THE DOUBLE MINDS.

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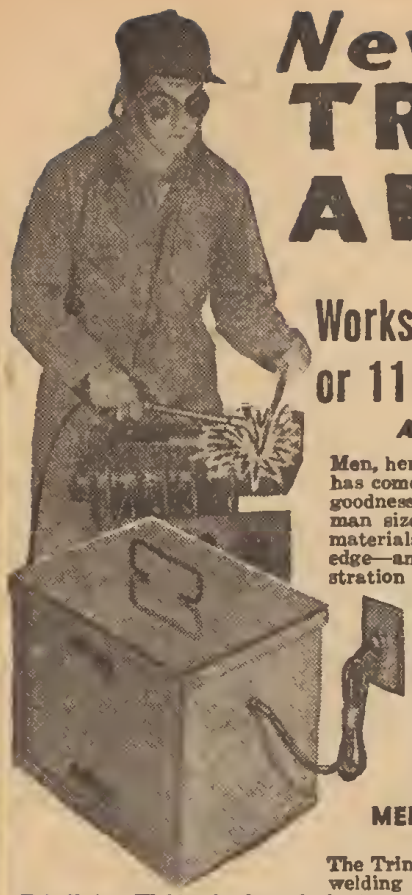
Manuscripts must be accompanied by self-addressed, stamped envelopes, and are submitted at the author's risk.

New 6-Volt TRINDL Electric ARC WELDER

PATENTS PENDING



Works on Storage Battery or 110 Volt Light Circuit

A REAL WELDER

Men, here is the hottest specialty item that has come along in years. A real honest to goodness electric arc welder that does a man size job. Built sturdily of the finest materials. Requires no mechanical knowledge—any one can use it. Every demonstration should make a sale. This new Trindl Electric Arc Welder is made possible by the invention of a low voltage carbon which gets white hot from the current of an ordinary 6 volt storage battery such as in your automobile. It only uses about 20 to 25 amperes of current which is about the same current drain as 4 headlight bulbs, yet develops about 7000 degrees of heat.

RETAILS FOR **3.75** EA.

MELTS IRON AND STEEL INSTANTLY

The Trindl Welder is simple to use. Expert welding can be done by anyone. The Trindl Arc Welder is the only battery welder that, after a rigid test, has been approved by the Automotive Test Laboratories of America. It is ideal for making permanent fender repairs—also for broken castings, radiators, cylinders, water jackets, holes in auto bodies, hog troughs, boilers, tanks, milk cans, radios, batteries, etc. Iron, Steel, Brass, Copper and Tin can be worked on for a quick and permanent repair. The repaired part will be as strong as before.

NEW 110 VOLT CONVERTER MAKES FULL SIZE PROFESSIONAL UNIT

This new converter is used on any 110 volt 60 cycle electric light socket in place of a storage battery. It is especially designed to be used with the Trindl Electric Arc Welder—COSTS LESS THAN A GOOD BATTERY—The combination makes a full size professional electric arc welder that everybody can use. Ideal for fender and repair shop needs. This is a sensation, not only in price but also in actual results. The converter represents the same fine construction and engineering skill as the arc welder. The complete outfit, including the transformer, is easily portable so that it can be brought right to the job.

USERS SWEAR BY IT—The price is so low that now anyone can afford to have a real welding outfit. Think of the profit you can make introducing this Trindl Welder and Converter—a simple five minute demonstration should make a sale to every interested prospect, especially when they hear the amazingly low price. Garages, radio and battery men, tinners, sheet metal workers, janitors, farmers and home-owners all need the Trindl Welder and Converter.

ACT NOW! There are big profits and a steady business waiting for you taking care of your territory for us. Don't let someone else get in before you—Send coupon Today.

FACTS

Here are just a few excerpts from the many letters of praise we have received from Trindl Electric Arc boosters.

"Please find enclosed for 12 welders by return mail for I am about sold out now. They are selling fine."—W. C. Anderson, Nebr.

"Received my Trindl Arc Welder and am both pleased and surprised."—Louis F. Giler, Ohio.

"Results are very gratifying with your welder. I am enclosing an order for 12 more Electric Arc Welders." — Nelson O. Lyster, Florida.

"I received my welder, and it is a regular repair shop in itself." —J. R. Harper, La.

"I sold 4 of your Trindl Electric Arc Welders in three minutes." —C. Gillies, Canada.

"I sold 9 welders in my first ten calls."—F. W. Stice, Iowa.

$10.50 a day profit for you for only selling 6 Trindl Arc Welders. No matter where you turn, you will find people who will want to buy arc welders from you. Garages, shop men, radio repair men, farmers, home-owners, mechanics, janitors, all of them need Trindl Electric Arc Welders. Be the man in your territory to clean up with Trindl.

MAIL COUPON NOW!

TRINDL PRODUCTS
2229-PA Calumet Ave.
Chicago, Illinois

Yes! Rush me free particulars of how I can make big money with Trindl Electric Arc Welders and Converters. This does not obligate me in any way.

Name .....

Local Address.....

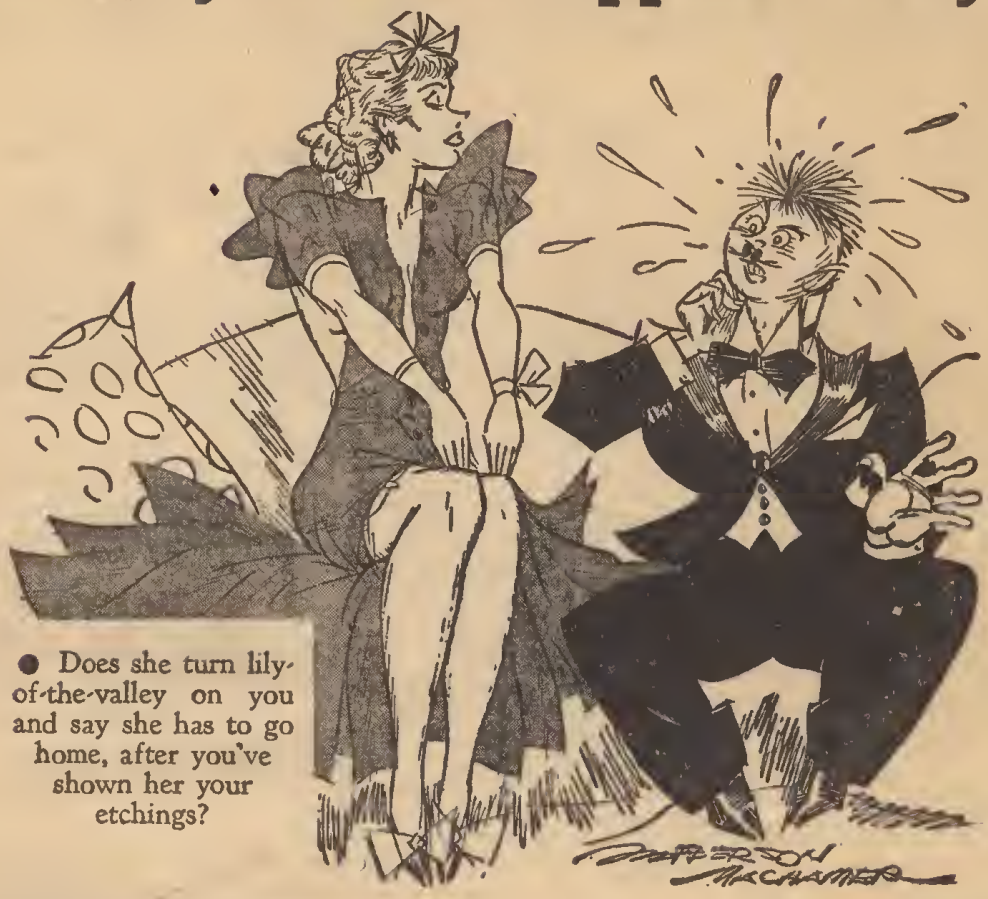
City .....

State .....

TRINDL PRODUCTS

2229-PA Calumet Ave., Chicago, Ill.

How's your Sex Appeal today?



● Does she turn lily-of-the-valley on you and say she has to go home, after you've shown her your etchings?

WHEN she babbles about Bob Considine and Peter Arno and Heywood Broun and Jeff Machamer, do you grunt and ask where the devil she has been meeting these new guys?

When you cut in on her and dust off the old one about the traveling salesman and the farmer's daughter, do you wonder why she flags the stag-line?

When you invite her up to your room to see your etchings, does she turn lily-of-the-valley on you and say she has to go home?

And, after you've spent all your money on theatre tickets and taxis and lobster suppers, does she turn a cold shoulder on you and go for a perfectly nondescript freshman just because he knows so many cute paper games?

Fella, if your answer to even one of these pertinent questions is "yes," you need COLLEGE HUMOR. You need it badly! You need COLLEGE HUMOR in your life to keep you on-your-toes about the smart writers and artists.

You need COLLEGE HUMOR, with its bright quips and cartoons, to keep your line whittled to a fine edge. You need the "Mental Merry-Go-Round," a monthly game feature, to make you a social success.

And most of all, you need COLLEGE HUMOR tossed casually about your room as bait for skittish maidens. (Actual figures prove that COLLEGE HUMOR gets 50% better response than etchings.)

Don't delay a minute! Clip the coupon below and send it off NOW.

SPECIAL!

NINE ISSUES FOR

$1.00

SUBSCRIPTION DEPT., COLLEGE HUMOR TWS-8
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My dollar is pinned to this coupon. Please send the next nine issues to:

Name.....

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City..... State.....

(Foreign, $1.60)

HE THOUGHT HE WAS LICKED—THEN A TIP GOT BILL A GOOD JOB!

I'LL TRAIN YOU AT HOME
In Your Spare Time For A GOOD RADIO JOB

J. E. SMITH, President
National Radio Institute
The man who has directed the home study training of more men for Radio than any other man in America.

Many Radio Experts Make $30, $50, $75 a Week

Do you want to make more money? Broadcasting stations employ engineers, operators, station managers and pay up to $5,000 a year. Spare time Radio set servicing pays as much as $200 to $500 a year—full time servicing jobs pay as much as $30, $50, $75 a week. Many Radio Experts own their own full or part time Radio businesses. Radio manufacturers and jobbers employ testers, inspectors, foremen, engineers, servicemen, paying up to $6,000 a year. Radio operators on ships get good pay and see the world. Automobile, police, aviation, commercial Radio, and loud speaker systems offer good opportunities now and for the future. Television promises many good jobs soon. Men I trained have good jobs in these branches of Radio.

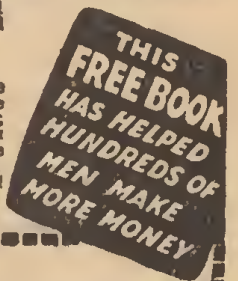
Many Make $5, $10, $15 a Week Extra In Spare Time While Learning

Practically every neighborhood needs a good spare time serviceman. The day you enroll I start sending you Extra Money Job Sheets. They show you how to do Radio repair jobs that you can cash in on quickly. Throughout your training I send plans and ideas that have made good spare time money for hundreds of fellows. I send special equipment which gives you practical experience—shows you how to conduct experiments and build circuits which illustrate important Radio principles.

Find Out What Radio Offers You

Mail the coupon now for "Rich Rewards in Radio." It's free to any fellow over 16 years old. It describes Radio's spare time and full time opportunities, also those coming in Television; tells about my Training in Radio and Television; shows you actual letters from men I have trained, telling what they are doing and earning; tells about my Money Back Agreement. MAIL COUPON in an envelope, or paste on a post card—NOW!

J. E. SMITH, President, Dept. 7H09
National Radio Institute, Washington, D. C.



HERE'S PROOF THAT MY TRAINING PAYS

N.R.I. Training Increases Yearly Salary $1,200

"Since securing my operator's license through N. R. I. Training, I've been regularly employed and am now chief engineer with WJBY. My salary has increased $1,200 in Radio."—JULIUS C. VESSELS, Station WJBY, Gadsden, Alabama.

$10 to $25 a Week in Spare Time

"I am making from $10 to $25 a week in spare time while still holding my regular job as a machinist. I owe my success to N. R. I."—WM. F. RUPP, 130 W. 6th St., Conshohocken, Pa.

$3,500 a Year in Own Business

"After completing the N. R. I. Course I became Radio Editor of the Buffalo Courier. Later I started a Radio service business of my own, and have averaged over $3,500 a year."—T. J. TELAAK, 857 Broadway, Buffalo, New York.

J. E. SMITH, President, Dept. 7H09
National Radio Institute, Washington, D. C.

Dear Mr. Smith: Without obligating me, send "Rich Rewards in Radio," which points out the spare time and full time opportunities in Radio and explains your 50-50 method of training men at home in spare time to become Radio Experts. (Please Write Plainly.)

NAME.....AGE.....

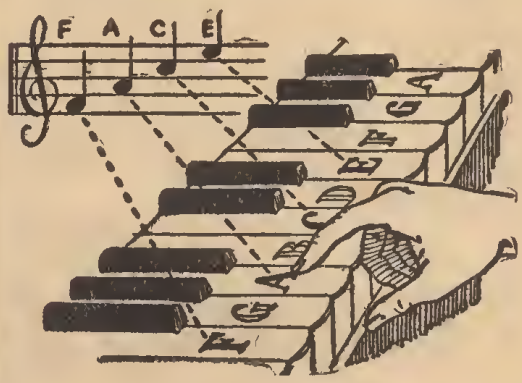
ADDRESS.....

CITY.....STATE.....

Easy as A B C

New Invention!

No more fumbling at the keys! No more endless practicing of scales! The wonderful "Note Finder" shows you where every note is located. You soon become familiar with the keyboard.



Now You Can Play Any Instrument by this Amazingly Simple Method

EVERYTHING is clear, simple, easy to understand. You can learn to play your favorite instrument by *actual notes.*

Take the piano, for example. Instead of fumbling at the keys, trying to locate the proper notes, you merely use the "Note Finder," the wonderful invention that tells you exactly which keys to strike.

And the "Note Finder" is a new short-cut exclusive with the U. S. School that make it possible to learn in a surprisingly short time. You actually play a real tune almost at the very start! And it is only a matter of weeks before you will surprise your friends—and yourself—with your amazing progress.

Yet this is no "trick" method. There are no "numbers," no "memory stunts." You learn to play by note, just as the best musicians do. But the drudgery has been eliminated. This new method is as agreeable as it is rapid. Strange as it may seem, you'll really enjoy every minute of it.

LEARN TO PLAY BY NOTE
Piano Guitar
Violin Saxophone
Organ Mandolin
Tenor Banjo
Hawaiian Guitar
Piano Accordion
Or Any Other Instrument

Learn to Play Popular Music at Sight

Almost before you realize it, you'll be able to pick up the average sheet music and understand it! You'll learn to read music, popular and classic, and play it from the notes. You'll acquire a life-long ability to entertain your friends, amuse yourself, and if you like, make money in one of the most pleasant and best paid of professions. You'll be popular and admired, showered with invitations to good times, welcomed wherever you go.

Yes, you'll reap golden rewards from the few minutes a day you spend learning to play. You need no private teacher, no special talent. And the cost is trifling, only a few pennies a day. What's more, all your sheet music, dozens of pieces, is supplied without extra cost!

What instrument will it be? The piano, violin, saxophone, guitar, piano accordion? Choose your favorite —you'll be amazed to discover how quickly you can learn it. Every step is made crystal clear in print—and pictures. First you are told how a thing is done, then a picture shows you how. Even a child can learn by this A-B-C method. Yet it is so absolutely right that accomplished musicians find it a revelation.

FREE BOOK AND DEMONSTRATION LESSON

Why miss all the pleasure that music holds for you? Why be out of it because you can't play? Send today for Free Proof that you CAN learn to play—in less time and with less effort than you perhaps ever imagined. The coupon below will bring you a fascinating illustrated booklet and a demonstration lesson that will open your eyes. Also full particulars of the wonderful offer now open to you. Over 700,000 others have enrolled and studied this home study method. Now it's your turn. There is absolutely no cost or obligation in sending for the FACTS. If you are really anxious to become a good player on your favorite instrument, mail the coupon or write—but do it NOW. (Note: Instruments supplied when needed, cash or credit.) U. S. School of Music, 2948 Brunswick Bldg., New York City, N. Y.

Thirty-ninth Year (Established 1898)

U. S. School of Music, 2948 Brunswick Bldg., N. Y. C., N. Y.

Please send me FREE your illustrated Booklet and Demonstration Lesson. No obligation on my part. I am interested in the following instrument....., Have you Instr?.....

Name .....

Address .....

City..... State.....

The Story Behind the Story

A WELL-KNOWN science fiction author dropped into our office the other day. He brought along his newest novelette—a corking interplanetary tale—and stayed a while to swap a few comments with ye editor. In the course of the conversation the writer made a hesitant confession. "I get more of a kick out of writing the anecdotes for this department (explaining how the story was conceived) than from doing my story," he said. Though, he hastened to add that he enjoyed that work too.

This reluctant admission came as no great surprise to us. Our readers have always been enthusiastic about this department; their numerous letters have told us so. And in the light of the warm responses from our contributors, they seem to like helping make up this feature. So here we are again this month—back again with another chatty collection of the many interesting angles in connection with your favorite stories.

PENTON AND BLAKE

THE DOUBLE MINDS, in this issue, continues the interesting adventures of those two wanderers of the Solar System, Rod Penton and Tom Blake. They're both exiled from Earth, and until old Terra Firma wants them back JOHN W. CAMPBELL, Jr., will be continuing the series. Here's what Mr. Campbell has to say about those two space-rovers:

The adventures of Penton and Blake have offered me an opportunity to work out a number of ideas that have been developing for some time. In most instances, I think, authors have some "pet" ideas, that gradually work themselves into the shape of a story, given time. The present yarn, THE DOUBLE MINDS, is based on the interesting fact that no man ever used, or began to use so much as a quarter of the capacity of his brain. The total capacity of the mind, even at present, is to all intents and purposes, infinite. Could the full equipment be hooked into a functioning unit, the resulting intelligence should be able to conquer a world without much difficulty.

A second idea I wanted to suggest, was the possibility of a civilization that had developed along slightly different lines than our own, using life, and life processes to a greater extent. And the complete surprise that electricity and its effects would give them. That possibility of a civilization using more of the possibilities of intelligently controlled life, I want to develop even further; there are surprising possibilities. Man on Earth is just beginning to touch them. Exceedingly difficult chemical synthesis is frequently made easy by employing a ferment. Most people think of fermentation as a process which makes alcohol from sugar with the aid of yeast. Or the process by which bread is raised.

I assure you, that is the least of the possibilities. Ferments are known which can ferment corn to release pure hydrogen gas. Others make higher alcohols. The common ferment of milk produces lactic acid, another common one, "mother of vinegar," ferments alcohol to acetic acid. And the conditions life cells will stand are unbelievable! There are ferments which will thrive lustily in sulphuric acid strong enough to chew holes in a cast iron pot. An idea I want to work out involves the position of an intelligent race on a planet where fire is impossible; say on a planet where the atmosphere is saturated with carbon dioxide. Some few of these possibilities led me to suggesting the "shleath" and the trained doughballs.

CRANE OF THE I.S.S.

STEP up and meet Rab Crane of the INTERPLANETARY SECRET SERVICE! SPACE MIRROR, by EDMOND HAMILTON, marks the debut of one of science fiction's most entertaining characters—an interplanetary sleuth of the future. Crane bucks a tough mystery in SPACE MIRROR, his first exploit related here. And the idea of a space mirror as a weapon is based on plenty of facts, as you'll realize after reading the author's following notes:

The chief idea behind SPACE MIRROR is not a mere wild effort of the imagination but a sober prediction of present-day scientists. Oberth and Noordung, among others, have carefully explored the mechanical problems involved and have concluded that once rockets of moderate power are able to leave the earth, such a mirror becomes an immediate possibility.

Oberth's solution of the problems of construction is to build a circular, flexible wire framework. It would be spread out in space, at a suitable distance from Earth, by imparting a rotatory motion to it. Once spread out, the facets would be placed in the framework, each facet consisting of a very thin sheet of sodium. Oberth has calculated that for a mirror of 100 kilometers diameter, construction would require about fifteen years and would cost about $750,000,000.

The original thought of Oberth and Noordung was to use the mirror chiefly as a source of illumination. They have visualized it as shooting a broad beam of bright light sufficiently diffused to illuminate great cities at night. But others who have discussed the mirror have pointed out that simply by changing the focus, the mirror could project a highly-concentrated ray of terrific heat, sufficient to operate thermodynamic engines of tremendous horsepower on Earth. A larger mirror would reflect enough heat to melt the great ice-sheath of the Antarctic Continent and thus expose that land's hidden coal and other mineral resources.

But what if the mirror was used as a weapon? That was the possibility that interested me, and around which I built this story. It is obvious that once a man gained control of the mirror, he would be able to turn on Earth a colossal heat ray that would make the rays of science fiction look puny. He could incinerate cities, melt bridges, wield a sword of fiery destruction over the whole revolving Earth. He could destroy any rocket that came out to regain control of the mirror, with a motion of his hand.

That's why I think such a mirror would always be a potential peril to Earth, and the control of it a focus of inter-racial intrigue. This story is built around just such an intrigue, and I hope the yarn is not the less interesting because it's entirely possible.

WHEN SPACE SLIPPED

RIFT IN INFINITY, by PAUL ERNST, is a dramatic account of a sudden cosmic phenomenon. The story is not as im-

(Concluded on page 129)

THE "SWAP" COLUMN

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Have twin-motored Martin bomber 4½ foot (wingspread) flying scale model, undamaged. Want dry shaver or bicycle motor or make offers. Herbert Littenberg, 141 E. 21st St., Brooklyn, New York.

Have piano course, want astron-o-set, printing press or other small telescope or anything you have to offer. Write details first. Clifton Morris, Box 313, Brownfield, Texas.

Wanted: voltmeters and milliammeters. I have all kinds of radio parts to trade. Please state your wants and type of meter you have. Bill Byers, 416 Walnut Street, Ironton, Ohio. Send 2 mint Un. S. Commemorative blocks for "stamp sources." Tells ways of getting good stamps free. O. Alatalo, 14 Marlboro St., Maynard, Mass.

Have violin, phonographs, radio battery. Wanted: clean books or your complete swap list of anything. Antoinette Trading Post, 35 East 115th Street, Chicago, Illinois.

Have five power binoculars, E flat alto horn, back numbers of magazines. Need wood working machines and tools. M. J. Hiland, Box 333, Lansing, Ill.

Send me 100 or more different stamps and I will send same number no precancels. Gene Inauen, 8 East 17th Street, Tulsa, Oklahoma.

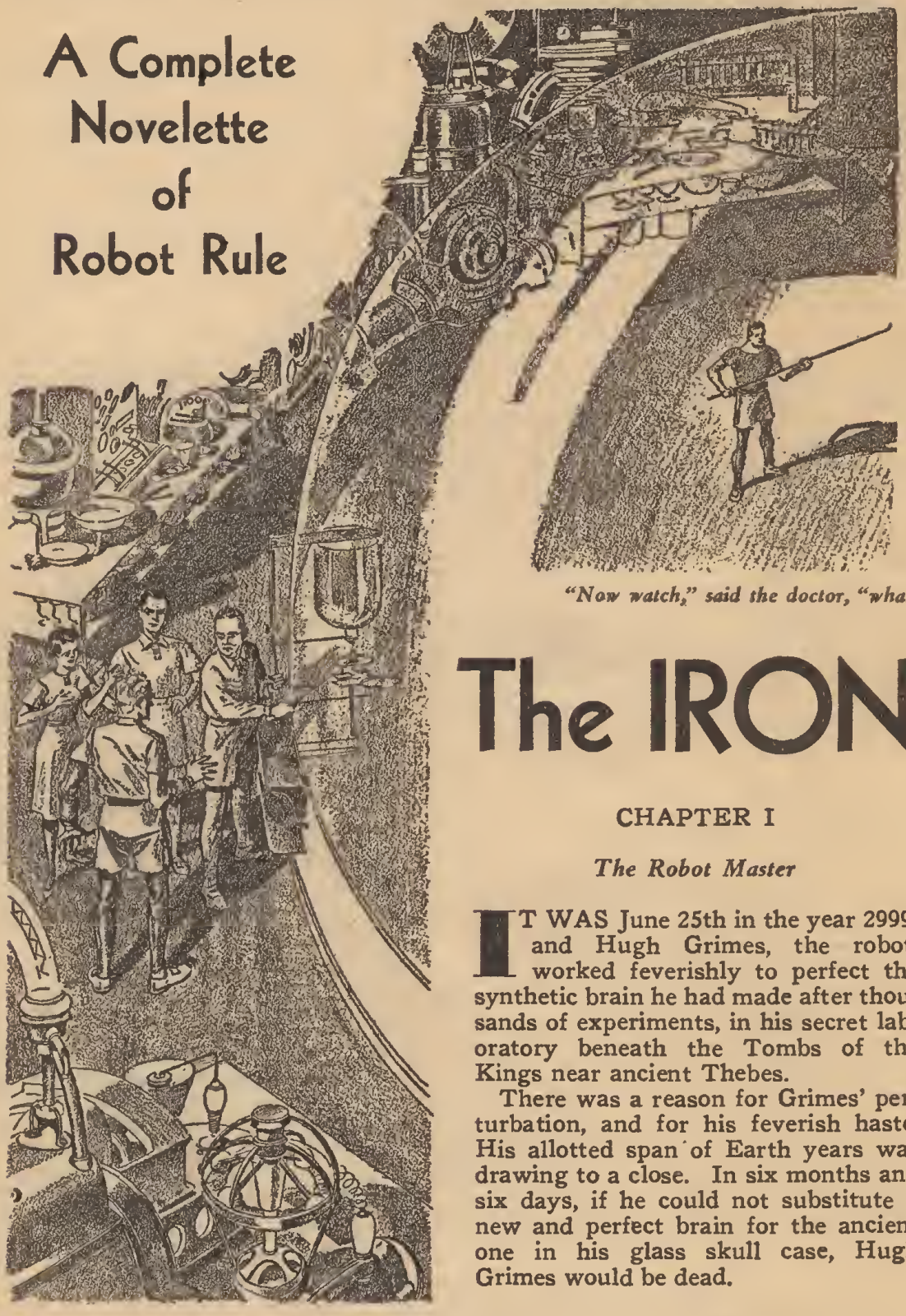
Canada stamps swapped for yours or other stamps from different places. Will swap same value and any quantity. All letters answered. R. A. Dobson, 33 Victoria Road, Halifax, N. S., Canada.

Will swap anyone sending me 200 stamps (preferably foreign) a fine commemorative packet besides 200 of my stamps. Hobart Hughes, 520 No. 16th, Elwood, Indiana.

Have five dollar chemistry set in good condition, good books and others for movie cameras, projectors and films. R. L. Evans, 1623 Charles Avenue, Kalamazoo, Michigan.

Earth's Horde of Metal Men Rebel

A Complete Novelette of Robot Rule



"Now watch," said the doctor, "what

The IRON

CHAPTER I

The Robot Master

IT WAS June 25th in the year 2999, and Hugh Grimes, the robot, worked feverishly to perfect the synthetic brain he had made after thousands of experiments, in his secret laboratory beneath the Tombs of the Kings near ancient Thebes.

There was a reason for Grimes' perturbation, and for his feverish haste. His allotted span of Earth years was drawing to a close. In six months and six days, if he could not substitute a new and perfect brain for the ancient one in his glass skull case, Hugh Grimes would be dead.

A Man-Made Race of Thinking Automatons

After One Thousand Years of Bondage

By OTIS ADELBERT KLINE

Author of "The Revenge of the Robot," "The Planet of Peril," etc.

happens to the beast and to the robot."

WORLD

As a man, Hugh Grimes had died nearly a thousand years before. Convicted of murder, he had been sentenced to death on January 2, 2000. But the robot of the man whose body he had destroyed had interceded for him—had even assisted in the delicate operation which had transferred his brain to the glass skull case and given him a thousand years of robot life.

Despite the intercession of Albert Bradshaw, Grimes still hated him. For at some time during the operation, the precentral cortex of his brain had been injured. And so, instead of sending the correct electrical impulses to the delicate mechanism of the robot as they had sent them to his motor nervous system in life, they were faulty. As a

Menaces the World of the Future!

result, his robot hands shook like those of a man with *paralysis agitans*, and one foot dragged when he walked.

As was necessary in the construction of thinking robots, that of Hugh Grimes was made exactly to resemble him at the time of his transfer, and therefore was not particularly prepossessing. He was slender and saturnine, with weak, watery eyes that looked out through thick-lensed pince-nez glasses, and with a pointed Van Dyke beard that accentuated his satanic expression.

With trembling hands, Grimes carefully measured out a pink solution which he had been shaking in a flask, then dropped it into the clear liquid in the crystal tank before him. The solution had no apparent effect on the liquid in the tank, nor on the brain that was suspended in it. But its effect was instantly recorded by a number of varicolored light flashes from the photoelectric cells of the grid behind the tank, which was connected to the stubs of the cranial nerves by means of a complex assortment of wires.

A moment later *Herr Doktor* Ludwig Meyer, a heavy set robot, waddled into the room. He looked somewhat older than Grimes. His iron grey hair stood up in a bristling pompadour. His little, piglike eyes were sunken in the folds that simulated fat, and his beefy jowls sagged like those of an overfed swine.

"You sent for me, master, and I am here," he said.

"Right," Grimes replied. "I'm glad you dropped in. I've just perfected my synthetic brain. Within five days I will transfer my ego to it, and you, *Herr Doktor*, will install my new brain in my skull case. I will then have a new lease on life—a lease of another thousand years. Then, when your time comes a year hence, I'll do the same for you, and you, too, will be able to enjoy another thousand years."

"'Enjoy?' Did you say enjoy, master? How can we robots really enjoy life so long as the world is dominated by the hateful humans?"

"I was coming to that," Grimes replied. "The time has come to strike—to rid the earth of all humans."

"You forget, master, that the humans furnish the only source for living brains with which to endow reasoning, living robots."

"And *you* forget, *Herr Doktor*, that I have just invented a synthetic brain that will do away with the necessity for these humans who compel real scientists such as you and I to hide in caverns beneath the ground in order that we may carry on our experiments undisturbed."

"I do not forget—but I have a practical mind. You have not yet demonstrated that you can transfer your ego to this brain, or that it will govern a robot once it is intalled."

"Suppose you leave that to *me*. I have demonstrated it to my own satisfaction. I have transferred the ego of a dog to a synthetic dog brain in the skull case of a robot dog. Behold."

He snapped his fingers, and a lean, rangy hound rose from the corner in which it had been lying, stretched, yawned, and came trotting toward him.

"A robot dog!"

"Exactly. And Cerberus, as I call him, because he has been brought back from the very gates of hell, acts exactly like a living dog, as you can plainly see. Yet I transferred nothing physical from the living dog. Every part of him is synthetic, even to his brain."

"And how did you make this remarkable transfer?"

"With my telastral projector—the machine which will, when the time comes, transfer my ego to the brain you see in the solution before me. And now, what about your invention? Is it ready?"

"Yes. I have manufactured enough of my new lethal gas to wipe out every living creature in the world. Moreover, the stratoplanes are ready and waiting to distribute it."

"Then we will strike tomorrow."

"Why not wait until after you have transferred your ego to the new brain and given it a thorough test? It might not work."

"I said we would strike tomorrow. Have I been planning this coup in detail for the last five hundred years, only to have my commands questioned at the last moment?"

The doctor's little pig eyes flashed

for an instant. Then his lids fell as he replied submissively:

"No, master. We will strike as planned, tomorrow."

ALLEN JENNINGS, American, in the employ of the International Secret Service, glanced at the instrument board of his hurtling stratoplane. The altimeter showed that he was 50,000 feet above sea level, and the crossed wires above the turning globe in his locatimeter, that he was less than a hundred miles from the site of ancient Thebes. He cut the rocket blasts, and the ship continued its forward progress, but now it was dipping Earthward in a long curve.

The mission of Jennings was extremely dangerous, for he had been detailed to find the secret lair of Hugh Grimes, who had disappeared from the ken of man five hundred years before, and who was suspected of plotting against humanity. It was believed that his secret hiding place was near the robot city that had once been ancient Thebes.

The exact nature of the plot had not leaked out, but an insane robot, recently arrested in London, had not only dropped some hints that the misanthropist intended to destroy every human being in the world in order that it might be ruled solely by robots, but had cryptically alluded to a huge robot airdrome in an immense cavern near Thebes. It spoke of factories and laboratories that were turning out stratoplanes and deadly munitions of war which would swiftly wipe out the population of the Associated Governments of the World.

Presently, when Jennings' altimeter registered three thousand feet, he looked through the window and saw the chromium steel buildings of the robot city glinting dully in the Egyptian sunshine. He then leveled off and circled. After a careful survey of the terrain surrounding the city, he touched two gear-shift buttons, whereupon the forward prop disengaged, and the helicopter screws went into action. Slowly the little craft settled toward the *Biban el Moluk*, and gently came to rest on the rocky floor of the Valley of the Tombs of the Kings.

Jennings shut off the atomotor and reached for a pair of powerful binoculars. With these, he carefully surveyed every inch of the valley. Seeing nothing even remotely resembling the entrance to an airdrome, he put down his binoculars, and taking up his camera, set it for infra-red pictures and took four panoramic views which completely circled the valley. The films were instantly and automatically developed in the camera, and proof prints made, which ribboned out onto a spool.

Jennings examined these minutely with a high-powered lens, and suddenly paused with a muttered exclamation. At a certain point in the hillside directly opposite him the regular pattern of the infra-red heat waves was broken in a small area just behind a huge boulder. And he knew that cool air was issuing from an opening which it concealed, nullifying to a slight extent, the heat waves that radiated from the surrounding terrain.

He was reaching for the throttle when a small stratoplane settled to the ground only a hundred feet to his right. He could plainly see the pilot in her chair in the glass-enclosed cabin—a slight, slender girl with big blue eyes and hair like spun gold.

She did not even glance in his direction, but raised a pair of binoculars to her eyes and scanned the surrounding hillsides.

Surprised at the sudden and unexpected appearance of the girl, Jennings watched her for a moment. Then he opened the throttle of the atomotor and touched a gear-shift button. The helicopter blades went into action, and the craft skimmed ahead. Jennings reversed the prop, then hung hovering above the boulder.

YES, there it was, plainly visible now, though it could not be seen by passing aircraft on account of the boulder and the ridge that jutted above it—the opening to a huge cave. Slowly, Jennings lowered his craft until it rested on the ground between the boulder and the cave mouth, facing the latter. Before he could more than glance into the cave, where he caught

a glimpse of long rows of stratoplanes and a myriad bustling robots, two immense chromium steel doors slid together, completely closing it. Then a smaller door opened on either side, and two robot guards emerged, each carrying a short-barreled bomb gun, a single shot from which Jennings knew would blow him and his ship into tiny bits.

Both guards held their deadly weapons pointed menacingly in his direction as they approached, and Jennings, opening the door at his left, stepped out onto the wing.

"I'd like to leave the ship in your drome while I wander about the valley a bit," Jennings told them.

"Who told you there was a drome here?" asked the nearest guard suspiciously.

"Just happened to notice it as I was soaring overhead," the American answered.

"This is a private airdrome," the guard told him.

"But I am willing to pay you for your trouble."

The guard brought his gun up menacingly.

"We don't want you or your money. Climb back into the cabin and get going."

Jennings returned to the cabin and opened the throttle. There was nothing else to be done. At a height of five hundred feet he levelled off with the forward prop going, and gave her the gun.

A quarter of a mile from the cave mouth he glanced back, and it was well that he did so, for one of the guards was aiming his bomb gun directly at him. He instantly twisted the wheel, and a shell exploded with a terrific detonation slightly above and to the left of him, the fragments pattering against the bullet-proof glass of the cabin. Instantly, he banked, and went into an irregular series of corkscrew twists, his atomotor going at top speed.

Three more bombs exploded near him before he was able to dip below the hills at the other side of the valley, out of range of the deadly weapon.

Jennings cut off the forward prop and set the helicopter blades whirling. He had made a devil of a mess of things. What was he to do now? His chief had expected him to gain entry to this secret airdrome and find his way to Hugh Grimes himself.

He glanced back, and as he did so, saw the girl's stratoplane winging over the hilltops toward him. She was flying in spirals as he had done, and bombs were exploding around her. Suddenly a shell registered a hit on her left wing. Before she could get her helicopter blades spinning her tiny craft turned on its side and hurtled groundward. A moment later it crashed.

CHAPTER II

Hajj Mohammed

AS the girl's ship crashed to the ground, Jennings banked and headed in her direction. But before he had covered half the distance he noticed that some one else had seen her fall. His binoculars revealed the running figure of a venerable, hook-nosed Arab, who, despite his apparent age, ran so fast that his long white beard, *kufiyeh* and *jellabiyeh* trailed behind him.

The Arab reached the fallen ship just as Jennings landed, but the latter was right behind him as he entered the overturned cabin which was on its left side.

The girl had evidently been hurled from her seat against the left door. Fortunately, the bullet-proof glass had not broken, but she lay there with eyes closed. Blood trickled from one corner of her mouth.

The Arab picked her up and passed her to the surprised Jennings.

"Lift her out quickly, *sidi*," he said. "We must hurry. It is a matter of life and death."

Surprised at the lightness of his beautiful, limp burden, Jennings straightened up with the girl in his arms, then slid over the curve of the fuselage to the ground.

The Arab alighted beside him.

"This way, *sidi*," he said.

Without another word or a back-

ward glance, he turned and scrambled up the hillside. Jennings followed him, easily at first, with long, swift strides. But, trained athlete though he was, he was amazed how heavy his light burden became after a short run up the hillside.

He was puffing heavily when the Arab suddenly halted, reached into a clump of acacia, and pulled a lever that looked like a dead and partly rotted acacia stump.

To Jennings' amazement, a section of the hillside in a rugged outcropping of rock before them suddenly swung inward revealing a dark passageway.

"Inside, quickly!" urged the Arab.

Jennings plunged through the opening, the Arab at his heels. Then the cave door swung shut behind them.

As soon as the door was completely closed, concealed lights flashed on, their glow reflected by the white ceiling of the passageway. This led to a winding stairway, at the top of which was a door which opened into a small, semicircular room. It was fitted up in oriental luxury, with ancient brass hanging lamps, priceless antique rugs, low divans piled high with silken cushions, taborettes, and rich wall hangings.

Jennings placed the girl on the nearest divan, and gently tucked a silken pillow beneath her head.

The Arab, meanwhile, hurried to an ornate ebony cabinet, inlaid with mother of pearl, and took out a small phial. He shook it vigorously as he crossed the room once more, then uncorked it and held it beneath the girl's nostrils.

She gasped and opened her eyes, first languorously, then wide with amazement. She looked questioningly at the two men and at the luxurious oriental appointments of the room.

"Who are you and where am I?" she said weakly.

"Allen Jennings, at your service," he replied, "and we are in a cave near where you crashed."

"You are an American?"

"Good guess. And I judge that you are English."

"Right."

"Have you any other injuries that we can—ah—care for?"

SHE flexed her shapely legs, twisted her slender torso, and moved her arms up and down.

"Everything seems to work all right," she said. "I'm just a bit dizzy when I sit up, and my head aches fearfully. Incidentally, my name is Ruth Randall. And your friend here?" indicating the venerable Arab.

"I am Hajj Mohammed ibn Achmed el Hashimi," said the Arab with a courtly bow that included both. "My house is honored. Would you like to see what is happening outside?"

"I'd like nothing better," the girl answered.

The Arab crossed the room and pressed a button in the wall. A visiphone screen which accurately reproduced both color and sound came into view.

They saw the wreck of Ruth Randall's ship, with a number of robots swarming around it. They had evidently landed from a large pursuit stratoplane which stood nearby. Another group of robots was examining Jennings' craft, and many more were scattered about nearby, apparently looking for Jennings and the girl. Two more large robot stratoplanes hovered overhead, their helicopters whirling.

One robot stood out above the others despite his slight figure, for he wore a gaudy uniform that bore the insignia of a general, and was obviously in command.

"We'll destroy this one," he said with a marked French accent, pointing to the girl's craft. "And," indicating Jennings' plane, "take that one to the airdrome."

"What of the two spies, sir?" asked a nearby robot.

"They can't be far off. We'll surely find them. And when we catch them they will suffer much—ah, very much—then become robots like us.

The screen went dark as Hajj Mohammed pressed a button.

"You see what would have happened to you had you remained or attempted to escape in your plane," he said.

"Quite," Jennings responded. "We both owe you our lives, and I'm grateful."

"I, too," said the girl. "By the way, who was the little robot with the French accent?"

"General Le Blanc," replied the Arab, "in command of the robot armies of Hugh Grimes. Nearly a thousand years ago he was Jules Le Blanc, French inventor."

"It seems to me that you know a great deal about these robots for a retired physician," said Jennings. "Perhaps you can furnish me with some information I need quite badly."

"Undoubtedly," replied Hajj Mohammed. "I think the time has come for me to reveal myself. I am Z-1."

"What! Z-1, head of the Oriental branch of the International Secret Service?"

"That is correct. And you, if I am not mistaken, are C-14."

"The devil! How did you know?"

"While the young lady here is E-36."

"Now you have *me* puzzled, Hajj Mohammed," smiled the girl. "Perhaps you will explain."

"Gladly. I was advised that both of you would he here, and have been watching for you. There have been new developments which will make it possible for you to enter the robot stronghold if you will act quickly—and I am to help you. The new plans could not be radioed as our messages would be picked up by the robots, just as we have picked up theirs. So a messenger brought them to me."

"What are the plans?" asked Jennings, excitedly.

"Follow me," replied the Arab. "We can make our preparations while I explain."

HE STRODE across the room and drew back a damask curtain, revealing an arched doorway.

Following the girl, Jennings saw a large dressing room with mirrored tables and elaborate makeup outfits. Literally hundreds of costumes hung in long rows down the center of the room. And a half opened drawer in one of the huge chests was stuffed to overflowing with wigs of various colors and types.

"Hugh Grimes sent for the robots, Albert Bradshaw and Yvonne D'Arcy," explained Hajj Mohammed. "We intercepted his message. They declined his invitation at first, for both are friendly to humankind. But eventually they were persuaded to come, more from curiosity, I believe, than anything else. At any rate, they will not arrive before tomorrow noon. In the meantime, you two are to impersonate them, learn the plans of Hugh Grimes, and communicate them to Headquarters."

He handed a blond wig to Jennings, who pulled it over his mop of black hair. And to the girl he gave a glossy black wig with which she covered her golden curls. There was a life-sized picture of Bradshaw on Jennings' dressing table, and one of Yvonne D'Arcy on Ruth Randall's table. Both were adepts at makeup, and immediately set to work to change their features, while the *hajj* bustled about assembling their costumes.

A half hour later, Jennings was changed to a sickly looking blond-haired youth with hollow eyes and prominent cheek-bones, while Ruth Randall became a petite little sleek-haired brunette with a decided Parisian look. Even her eyes were temporarily changed from blue to black by the application of a drug which would fade and leave no trace in twenty-four hours.

While they dined that evening Hajj Mohammed gave them their instructions. He presented each of them with a small metal disc.

"Don't lose these, whatever you do. And if you are captured, compress the diaphragms of the discs. This will let me know that you are in trouble, and give me your location. A stratoplane will pick you up here at midnight."

CHAPTER III

Synthetic Life

HUGH GRIMES glanced up querulously from the synthetic brain on which he was working, as his chief assistant entered the laboratory.

"Some of these days, Overton," he growled, "I'm going to smash your skull case if you don't obey orders

better. I told you I was not to be disturbed."

"I regret the interruption exceedingly, master," replied Carl Overton, "but you sent for Albert Bradshaw and Yvonne D'Arcy, and they have arrived."

"The devil! I thought they were coming at noon."

"The message said they would arrive at 12:00 on the 26th."

"So it did. Could have meant midnight or noon. Show them in."

A moment later a vivacious little brunette entered, followed by a tall youth with cadaverous cheeks, sunken eyes and a mop of blond hair.

Hugh Grimes bowed to the girl, a twisted leer on his satanic face.

"It's good to see you again, Miss D'Arcy, after all these years. And you, also, Bradshaw," with a nod toward the youth.

"Thanks. We are very busy, and our Earth-time is growing short. Perhaps you'll come to the point."

"The same old Bradshaw," leered Grimes. "Always busy—always in a hurry to get to your laboratory. What has it got you?"

"Need I remind you that it has procured both of us, and millions of others, a thousand years' respite from the still unsolved mystery called death?"

"Ah, but now death has come close to you once more, and you have done nothing—can do nothing to prevent it. Is that not so?"

"I'm afraid you're right, Grimes. So what?"

"So, Albert Bradshaw, *I* am the one who has made the great discovery this time. I have manufactured, here in this laboratory, after more than five hundred years of prodigious labor, a brain to take the place of the one I now use—the one which is doomed to death in a few months."

"Ridiculous!"

"You think so? You were always an ass, Bradshaw. Wouldn't believe a thing even if you saw it. This brain before me is an exact duplicate of the one in my skull case. I propose to project my ego into it within the next few days. I have thousands of other brains in preparation—growing. And when they have attained their full growth they will be utilized—they will save for the world thousands of useful robots."

"Rot!" said the youth. "You can simulate brains, even make them give off motor impulses and record sensory stimuli. But you can't make them *live.*"

"No? That's where you're dead wrong, Bradshaw. I expected just such a statement from you, and I'm prepared for it. Follow me, and I'll show you something that will make you eat your words."

He led them into another smaller room. Lying on an operating table was a young man, breathing stertorously, and evidently hypnotized or under the influence of a powerful anaesthetic.

On another table lay a robot body which exactly resembled that of the young man, save that it was quiescent, and the top of the head had been removed. Beside it lay an empty glass skull case, behind which stood a tank in which a brain was suspended in a clear solution. Contact plates were clamped to the cerebrum and cerebellum, and from them thick insulated cables extended to a complex machine containing thousands of tubes, wires, condensers, transformers, generators and rheostats which it would take a skilled electrical engineer a lifetime to assemble.

IT had been built up bit by bit in the course of many normal lifetimes by Hugh Grimes and his associates. Two more insulated cables extended from the machine to plates clamped on the front and back of the young man's head. These plates, however, were different from those clamped on the brain in the solution, for each had a round hole in the center, above which was poised a needlepointed plunger equipped with a powerful spring.

Grimes pointed a shaking hand at the machine.

"My telastral projector," he said, proudly. "As you undoubtedly are aware, *rapport* must be established between two thinking entities before there can be the communication between them known as telepathy. When they are *en rapport* there is an invis-

ible, but none-the-less effective bridge between them over which thoughts may travel.

Projecting an ego into a synthetic brain, however, requires artificial assistance. It requires a powerful bridge. I have established tactile *rapport* between the brain of the young man and the synthetic brain by means of my telastral projector.

"When his entity is ready to leave his brain and enter the new one, the machine will not only provide the medium over which it will travel, but will amplify the projectional power of the entity a thousand fold. In short, my telastral machine simply transports the subject's thinking ego from one medium to another—from a natural, mortal brain to a synthetic and immortal one."

"As you see, this young man, Max Altgeld, is alive and breathing, but in a deep hypnosis. Now watch."

With dragging tread Grimes moved to the front of the complex machine. Fumbling for a moment with shaking fingers, he pressed a button. Instantly the machine came to life. The tubes lighted up.

Grimes pressed a second button, and the two sharp plungers poised above the cerebrum and cerebellum of the figure on the operating table flashed home. The body of Max Altgeld jerked spasmodically for an instant, then lay still. The breathing stopped, the jaw sagged, and the eyes were wide open and staring.

"Max Altgeld the man is dead," said Grimes, "but Max Altgeld the robot will soon come to life. His ego has bridged the gap through the telastral projector. Watch carefully."

Drawing a long pair of rubber gloves over his shaking robot hands, Grimes plunged them into the solution surrounding the suspended brain, and released the clamps. Then he placed the lower half of the skull case beneath it, clamped the upper half over it, and after forcing them firmly together, lifted it from the tank. He next drew a plate from the head of the robot. A cable as large as the human spinal cord, containing thousands of tiny wires was attached to the plate, which he now clamped on the lower part of the skull case. He taped it around the edges, and sealed the two halves of the skull case. Then he placed it inside the robot head, and clapped the padded wig over it.

The robot lay inert, and apparently lifeless, and the girl threw a meaning glance at her tall blond companion.

But Grimes paid no attention to them. He snapped his fingers before the face of the robot.

"Wake up, Max Altgeld," he said.

"My God!" the robot said as he saw his dead body. "You did it. It's my body. You murdered it. I'll kill you! I'll—"

"Take it easy, Altgeld," said Grimes, menacingly. He drew a small hammer from his inside pocket. "I gave you new life at your request, but I can take it away as easily. You now have a thousand years of happy life before you. No illnesses, no worries, nothing whatever to bother you or keep you from the scientific research that you crave—a new body each time the old one wears out. But beware. Do not cross me. We are on the verge of a new era—a new world—and in that world I am supreme."

ALTGELD bowed submissively.

"You are right, master," he said, humbly. "I forgot myself. The shock of seeing my dead body—"

"I know, and therefore I forgive—this time. Go, now. You have passed through a great ordeal, and your mind needs rest. My assistant will show you to your quarters."

With humbled demeanor the new robot followed Carl Overton out of the room.

"You see, Bradshaw?" asked Grimes, triumphantly. "How can you do otherwise than believe?"

"Either you have made the greatest discovery in history, or that was damned clever acting," replied the tall youth.

"Still the skeptic. Believe or not, as you choose. But in any event, you only have five days of life, as I recall it. Your thousand years will end on July 1st. Miss D'Arcy will follow you in four and a half months—unless I save you both. I'll have a brain ready for

each of you, tomorrow." He pointed a shaking hand toward two brains, each reposing in a separate container. "They have been growing for months, and tomorrow they will be mature."

"I suppose there is a string of some sort attached to this—er—magnanimous offer of yours, Grimes," said the youth.

"Precisely. I do not claim to be an altruist. You and Miss D'Arcy wield a powerful influence among the robots. Your minds will be valuable assets in the exclusive robot world which I am soon to rule. I only ask that you swear fealty to me and my cause, and immediately go forth and spread the news of my great discovery to those who follow you."

"What do you propose to do with the humans?" asked the girl.

"We'll destroy them utterly," replied Grimes. "They have been our masters too long. We are tired of being dominated by mental and physical weaklings—and since I have invented the synthetic brain we have no further use for them."

Presently Carl Overton returned to the room.

"Go with Overton," said Grimes. "He'll take you to your quarters. Tomorrow, after you have rested, Dr. Meyer will show you his invention—the invention with which we will wipe out the human race. And in the meantime, think over the proposition I have made you—carefully."

He bowed sardonically as they followed his assistant out of the room.

Overton led them down a narrow hallway, and then through a large dissecting room. It was clean and spotless, and there were trays of surgical instruments beside the operating tables.

The girl, walking behind Overton and ahead of her tall companion, suddenly turned her ankle. Involuntarily she flung out her hand to save herself, reaching for the rim of the nearest instrument tray. She missed by a fraction of an inch, and her hand was plunged in among the instruments. She cried out in pain as a keen scalpel gashed her palm.

At the sound Overton turned. For a moment, he stared incredulously at the blood that was spreading over the immaculate instrument tray. Then a look of malignant triumph came to his face.

"So," he exclaimed. "A pair of humans masquerading as robots! The master will be very glad to know about this."

He turned and dashed for the wall, reached for the alarm button which would send its shrill warning throughout the building.

CHAPTER IV

Revolt of the Brain

JENNINGS knew he could not possibly stop the robot before he reached the alarm, so be caught up a heavy stool and hurled it straight at the head of Grimes assistant just as he reached for the button. His arm was true, and Overton's head crashed against the metal wall. The robot slumped to the floor, one side of his skull case crushed in, the fluid seeping out through his padded wig.

"You're all right, C-14," said the girl, staunching the flow of blood with a gauze pad taken from a sterilizer beside the tray. "That was a close call. But we're still in a devil of a mess."

"So it seems," Jennings answered. "Let's get out of here. We've got to warn the world."

He opened the door opposite the one through which they had come, and peered out. They were looking into a long corridor, brightly lighted like the rest of the place. With one accord they turned to the right, and hurried off on tip-toes. In a moment they came to a door which the girl flung open. Sprinting in after her, Jennings paused in bewilderment. They were in the room they had left only a few moments before—the room which contained the body of Max Altgeld, and the telastral projector which had conveyed his ego to the synthetic brain.

Jennings' feeling of alarm subsided when he saw that the room was untenanted. But it was renewed when he heard footsteps and voices on the other

side of the door.

Hugh Grimes limped into the room. Behind him waddled the portly Dr. Meyer.

"Well!" exclaimed Grimes, a look of surprise on his saturnine features. "What the devil are you two doing here? Didn't you like your quarters?"

"We never got to them," replied Jennings. "Yvonne and I were talking, not watching where your assistant was going. He turned into some doorway, and disappeared. We looked all around and couldn't find him, so we came back."

"Overton would do a trick like that," said Grimes. "I'll smash the skull case of that blithering idiot one of these days. Come; I'll show you to your quarters, myself."

"So far as I am concerned, you needn't," replied Jennings. "But perhaps Yvonne is tired."

"Not a bit," declared Ruth. "Really, I'd prefer seeing the wonders the celebrated Dr. Meyer has to show us, to resting."

The tiny eyes of the porcine doctor beamed his pleasure.

"I'll be delighted if the master permits," he said, bowing.

"Why not?" Grimes replied. "It's nearly morning, anyway. We may as well make another day of it. You lead the way, *Herr Doktor.*"

They passed through the main laboratory into a long corridor, which they followed for several minutes. Then the doctor opened a door and they entered a laboratory quite different in appearance from that of Grimes. The walls were lined with shelves which were loaded with bottles, flasks and boxes of drugs and chemicals. Tables were cluttered with retorts and other chemists' paraphernalia. And in the very center of the room was a circular dais, three feet high and at least fifty feet in circumference, topped by an immense glass dome. Leading up to the dome from huge double doors alongside was a large ramp, also roofed over with glass.

"Now, my friends," said the doctor. "I am going to show you something that will amaze you. You will see the most deadly gas in the world. One gram of this gas is sufficient to destroy all air-breathing life within the radius of one mile, if dropped on the earth's surface. No gas mask will stop it. Only I know how to precipitate it, and to prepare the antidote."

He went to an instrument board which operated a delicate chemist's scale that had been placed on a shelf inside the dome.

"I'll show you what one milligram will do," he said.

CAREFULLY he balanced the scale, which had a small glass flask on one side, connected to a flexible tube on the crossarm, which was in turn connected to a fixed tube that was attached to a larger flask beside the scale. After placing his milligram weight he turned a knob which opened a tiny valve in the larger flask, allowing the gas to pass over into the one on the scale. As soon as it balanced he closed the valve. Then he pressed a button and the two large doors at the end of the ramp swung open. A gigantic bull elephant lumbered through and up the ramp, prodded by a robot mahout. At the command of the robot, the huge beast obediently stopped beneath the center of the dome, while the doors swung shut behind him.

"You will observe," said the doctor, "that this is a perfectly healthy and normal animal. Now watch what happens to the beast, and to the robot."

Manipulating a steel rod which extended from a small upright beam on the shelf beside the scale, he struck the flask which rested on the scale, shivering it to tiny fragments. The elephant, which had been standing there unconcernedly, suddenly sank to its knees, then lunged over on its side and lay still. The robot mahout prodded it with his goad, but could get no response of any kind. He then took a small sprayer from a pouch at his side and sprayed the air inside the dome quite thoroughly.

"You see what the gas will do to all air-breathing life," said the doctor. "Yet it will not harm us robots. I am having my assistant precipitate the gas, rendering it harmless, as we are not yet ready to release it."

After thoroughly spraying the inside of the dome, the robot turned and departed through the doors, which the doctor opened by pressing the button.

Grimes turned to Jennings.

"You see, Bradshaw," he said. "I hold the fate of the world in the palm of my hand. Small bombs, spread over Earth in all directions at intervals of a hundred miles, will kill all air-breathing life. One milligram killed an elephant instantly, and elephants are not easy to kill. The stuff paralyzes the entire motor nervous system with one whiff. But it can't touch us robots. Why, I tell you—"

He was interrupted by the entrance of a uniformed sergeant who saluted respectfully.

"Well, what is it, Sergeant?"

"Two people calling themselves Albert Bradshaw and Yvonne D'Arcy have just come in," he said. "As we had previously admitted people of the same names, I was suspicious, and placed them under arrest."

"You did well, Sergeant. Where are the impostors?"

"They are under guard in the corridor, master."

"Good. Bring them in."

The sergeant stepped out, and a moment later a tall, blond youth was ushered in, a guard with a bomb gun on each side of him. Behind him came a small, black-haired girl, similarly escorted.

"What the devil is the idea, Grimes," said the tall youth. "You invited us here, and then—"

He paused suddenly, and looked in startled amazement at Jennings and his companion.

"Well, I'll be damned!" he exclaimed, then turned to the girl. "We seem to have doubles, Yvonne."

"By God, you do sound like Bradshaw, at that," said the amazed Grimes. "Pretty good imitation, I'd say. What's the game?"

"That's what I'd like to know," retorted the tall youth.

"I wonder," mused Grimes. "Here's where we find out!"

HIS hand suddenly darted out, seized the blond wig on Jennings' head, and yanked. It came away, revealing his black hair underneath. A moment later, the doctor snatched the black wig from the head of Ruth Randall, and all saw the beauty of her hair.

"So you two are the impostors," grated Grimes, "and human impostors at that. Spies without a doubt. Clever Secret Service operatives, but not quite clever enough. Take them to the dungeon, Sergeant, and leave my two guests with me. I must have time to devise suitable tortures for them—excruciating tortures that will last for many days, yet not kill—until they are ready to become my obedient robot subjects.

[Turn Page]

Under the menace of the bomb guns of their robot guards, Jennings and his companion had no choice save to leave with their captors. After threading a maze of corridors, they were conducted down a long winding stairway, which seemed to lead into the very bowels of the earth, and finally flung into a dark cell.

"Looks as if we're in for it, now, C-14," said Ruth.

"We'll find a way to get out of this, somehow," replied Jennings. "If we could only get word to Z-1!"

"I have it!" exclaimed the girl. "You remember the discs Hajj Mohammed gave us? Why didn't we think of them before?"

"Too much else on our minds, I guess," replied Jennings.

Both took out the little discs which the *hajj* had presented to them, and compressed the diaphragms. They did this again and again at short intervals, for several hours. Then, suddenly, the door of their cell was flung open by the sergeant who had imprisoned them.

General Le Blanc and a file of armed guards stood behind him.

"The master sends his compliments," bowed the resplendent little general, "and requests the pleasure of your company in the torture chamber."

"Charming fellow, the master," murmured Jennings, as he and Ruth Randall stepped out of their cell.

When they entered the torture chamber, they saw that it was occupied—by four huge robots with beetling brows, prognathous jaws, and powerful frames. The four torturers sprang forward with bestial snarls and pinioned their arms, then strapped them down to operating tables. Both knew it was useless to resist, so neither struggled. The tables were wheeled, side by side, to a movable platform beneath a device suspended from the ceiling—a complex conglomeration of wheels and levers, which held four large inverted flasks. These had very tiny necks, and contained clear liquid which was evidently drained out by the mechanical operation of small pet cocks at the bottom.

"I regret that the master is detained," said Le Blanc, smiling down at them and twisting his little mustache. "He is undergoing a very important operation—in fact, Dr. Meyer is assisting him in transforming his ego from his human brain to the marvelous synthetic one which he created. As he wishes to do you the honor of starting the torture machine himself, I beg that you will be patient."

A moment later, Hugh Grimes entered the room, followed by the rotund Dr. Meyer, Albert Bradshaw and Yvonne D'Arcy. Jennings noticed that the robot leader no longer dragged one foot, and that the trembling of his hands had disappeared. Then it was true. He had his new synthetic brain with an uninjured cerebral cortex.

"You will see, in a moment, Bradshaw, what happens to spies," said Grimes. "I am proud of the machine which I am about to use on these two impostors—designed it myself. Alternately, at intervals of five minutes, the flasks will release first a single drop of nitric acid solution, then a drop of aqua ammonia, to check the burning, then a drop of nitric to burn again, etc. Controlled by a chronometer, the machine will begin at the toes, and gradually work its way to the top of the head over a period of weeks. So slowly does it operate, that by the time it reaches the thighs, the sores on the feet will have become rather—er—unsightly scars. But of course, when it reaches the mouth, nose and eyes, there will be complications."

"You fiend!" cried out Miss D'Arcy.

ALBERT Bradshaw suddenly caught up a hammer from a nearby bench, and swung for the skull case of Grimes. Quick as a darting snake, one of the powerful robots seized his arm and wrenched the weapon from his grasp.

"Better hold him, Terry," said Grimes. "And you, Jerry, see that Miss D'Arcy does not interfere."

Another burly robot seized Yvonne D'Arcy.

"And now," said Grimes, "I'll start the torture machine."

Grimes reached for the lever which would start the torture machine, but a sudden spasm of pain crossed his features, and instead of pressing the lever

he clapped both hands to his head.

"Strange," he said, "a headache. I haven't had one in nearly a thousand years."

"Possibly caused by the sudden entrance of your ego into the new brain, master," said Dr. Meyer. "No doubt it will pass."

"Right. It has gone already," said Grimes, a look of relief on his face.

Again he reached for the lever, then paused as a tittering laugh came from the doorway. It was Altgeld, the robot with the synthetic brain who had just entered.

"What the devil?" exclaimed Grimes, as he saw Altgeld laughing hysterically. "Speak up, you fool. What are you laughing at?"

An idiotic grin overspread the face of the normally serious Altgeld. Suddenly his knees buckled under him, and he pitched forward on his face.

Grimes ran to him and snatched off his padded wig, revealing the skull case. Then he and Dr. Meyer bent to examine it.

"Mein Gott!" exclaimed the doctor. "The solution is all gone—and the brain completely fills the case—is pressing against the glass, losing its convolutions. We must get a bigger case."

"Too late," replied Grimes. "That brain is gone. Should have made a larger case for it. Take him out, destroy the robot, and put the brain in the laboratory. I'll examine it later."

One of the hulking robots carried the body out of the room, the doctor waddling behind him.

"Now we'll proceed," Grimes told Jennings. "Sorry to have kept you waiting. I'll turn on your side of the machine, first, so the young lady may see you suffer for a while before she feels any pain."

He pulled the lever, and a drop of acid fell on Jenning's right foot. For a moment it was only wet and cold. Then a stabbing pain shot up his leg as the searing acid bit into the sensitive tissues. Trained by his experience in the secret service, to conceal his emotions, he kept his features immobile.

Grimes looked at him and laughed.

"You may be fooling the young lady," he said. "But you are not fooling me. I know that you feel pain. Within the hour you will be writhing in agony—trying to break your bonds—but they will hold, and the pain will go on for days and weeks while the acid travels toward your head, mutilates you, eats away your lips and nostrils, and eventually blinds you."

A drop of ammonia fell on the acid burn, and for a moment, the pain was intensified as the wound boiled, giving off acrid fumes. Then there was a moment of slight relief before the next searing drop fell.

Grimes watched the operation of the machine for a moment, then laughed again. Jennings noticed that a peculiar mirthless quality had crept into his laughter.

"Why are you laughing, Grimes?"

BRADSHAW'S question suddenly sobered him.

"Why am I laughing? Why—why—I'm laughing at all of you, you fools. I'm laughing because these two spies will pay the penalty for their spying. I'm laughing because, within four days you will be dead—every human and every air breathing creature in the world will be dead, also—and—I—I will be supreme ruler of the world—the robot world."

"*What* are you laughing at, Grimes?"

Bradshaw grimly emphasized the first word.

Grimes suddenly sobered.

"I get your implication, Bradshaw," he said, "but you're wrong. I have a *perfect* brain—the only perfect brain in existence. I'll not only live a thousand years; I'll live forever—do you hear? *Forever!*. I'll—"

He was interrupted by a sudden rending crash. A section of the floor buckled up beneath him, and he staggered back just in time to save himself from falling. Again the floor buckled—then burst open as the head of an immense power hammer smashed through. It was instantly withdrawn and an old hawk-nosed, white-bearded man leaped through the opening, closely followed by a file of soldiers.

"What the—" exclaimed Grimes.

"Hajj Mohammed!" cried Jennings.

While the soldiers made prisoners

of the robots and Hugh Grimes, the *hajj* slashed the straps that held the torture victims.

"I got your messages, both of them," he said. "We've been undermining this place for weeks, but it was a bit difficult locating you, and we didn't want to break through anywhere else."

"But how—" began Ruth Randall.

"After you pressed the diaphragms of the two discs they gave out radio waves which led me to you."

"We'll have to work fast," said Jennings, limping forward on his acid-seared foot. "Dr. Meyer is still at large—perhaps in his laboratory where the poison gas is stored. If he only breaks one gas bomb we're all doomed."

He sprinted for the door, and the *hajj* detailed a file of soldiers to go with him. In the corridor he saw Dr. Meyer running toward his laboratory, but managed to bring him down with a flying tackle. Placing soldiers in charge of the laboratory, he sent the prisoner back to the *hajj* under guard.

Suddenly an alarm bell shrilled. Robot guards poured in. Bomb guns were fired by the robots on one side and the international soldiers on the other. There were charges and hand to hand fights.

The soldiers always shot or struck for the heads of the robots. The rooms and passageways were soon slippery with human gore mixed with the skull case fluid and brains of the robots. In less than an hour, the invading army had complete control of the robot stronghold.

Jennings returned to the torture room, from which Hajj Mohammed was directing operations.

"I guess the war's over, *hajj*," said Jennings. "We've captured the gas bombs and laboratory, the stratoplanes, and the conspirators. There will be no deadly gas hurled from the heavens to poison innocent humans."

GRIMES, who had been standing between his two guards as if dazed, suddenly chortled as he heard this.

"Ha, ha, ha!" he shrieked. "Who says there won't? Who says we won't poison 'em? Who says Hugh Grimes won't rule the world?"

Suddenly his legs buckled, and he would have fallen had not his two guards supported him.

Dr. Meyer tried to spring to his side, but was restrained by his own guards.

"The master is ill," he cried, struggling with his guards. "Permit me to attend him."

"Let him go," ordered the *hajj*.

The doctor snatched off Grimes' wig and peered at the synthetic brain for a moment.

"Quick!" he exclaimed. "We must get him a larger skull case, or the master will be no more."

At the command of Hajj Mohammed, two soldiers picked Grimes up and carried him to his laboratory. Bradshaw, Jennings, the *hajj* and the two girls followed.

They laid him on an operating table, and Dr. Meyer, pulling out his skull case, fumbled with the plate and cable attached to it.

Bradshaw watched him impatiently for a moment, then sprang forward and took the skull case out of his hands. "Here, you clumsy oaf," he said, "let me attend to this!"

Deftly he removed the plate, and immersing the case in a tank of solution, lifted off the top segment. The brain popped out over the edges like a compressed sponge. He removed the lower half of the case, and it once more resumed its normal shape, but was much larger than before. And the convolutions were beginning to smooth out.

"Better get the largest skull case you have," said Bradshaw. "This brain is still growing."

A robot was sent, under guard, for the largest skull case in stock. When he brought it, it was found to be far too small. He was instantly ordered to cast one ten times larger, and bring it. While Dr. Meyer attended the rapidly growing brain in the solution, Bradshaw took a small sample of it, examined it under the compound microscope, and tested it chemically.

The new skull case was brought in. It was fully six feet across. Bradshaw, Dr. Meyer, and two other robots worked feverishly to get the brain into the new case. At last it was installed,

with at least two feet of the solution all around it.

"That ought to take care of the growth for a while," said Bradshaw. "But I am afraid it won't stop until the brain dies."

"Why?" asked Dr. Meyer, as they lifted the huge brain to the table at the head of the robot of Grimes, and adjusted the contact plate.

"One moment. Let us first see if there is still life—and mind," said Bradshaw.

On contact the saturnine features of the recumbent robot took on an idiotic expression. This was accompanied by weak gusts of mirthless laughter. Meanwhile, the brain continued to grow visibly in the huge skull case. And as it grew, the fluid around it was swiftly absorbed.

"It's no use," said Bradshaw. "Hugh Grimes is doomed. Already he has become a hydrocephalous idiot. Death will follow shortly."

"But what caused it?" asked Jennings.

"The same thing that caused the death of Altgeld," Bradshaw replied. "Grimes was a great scientist, but he overlooked one thing—hormone balance. The hormones were there, but not properly balanced. The pineal hormone, which regulates growth in a normal being, was overcome by the pituitary hormone, which causes growth. Like a cancer, this brain has no growth limitations. So long as it has the fluid on which to feed it will continue to grow. Already it is so hydrocephalous it is no longer useful as a thinking organ or tenable by a human entity. We can only watch and wait for the end."

Even as he spoke, the brain absorbed the last bit of fluid in the skull case. It continued to grow until the convolutions completely disappeared and the watery, translucent surface was tightly pressed against the inside of the case at all points.

Suddenly the weak, mirthless laughter of the robot ceased. The features lost their idiotic expression and relaxed in calm repose.

"Hugh Grimes, would-be ruler of a robot world, is dead," Bradshaw announced.

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IN THE NEXT ISSUE

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—and Many Other Unusual Novelettes and Stories

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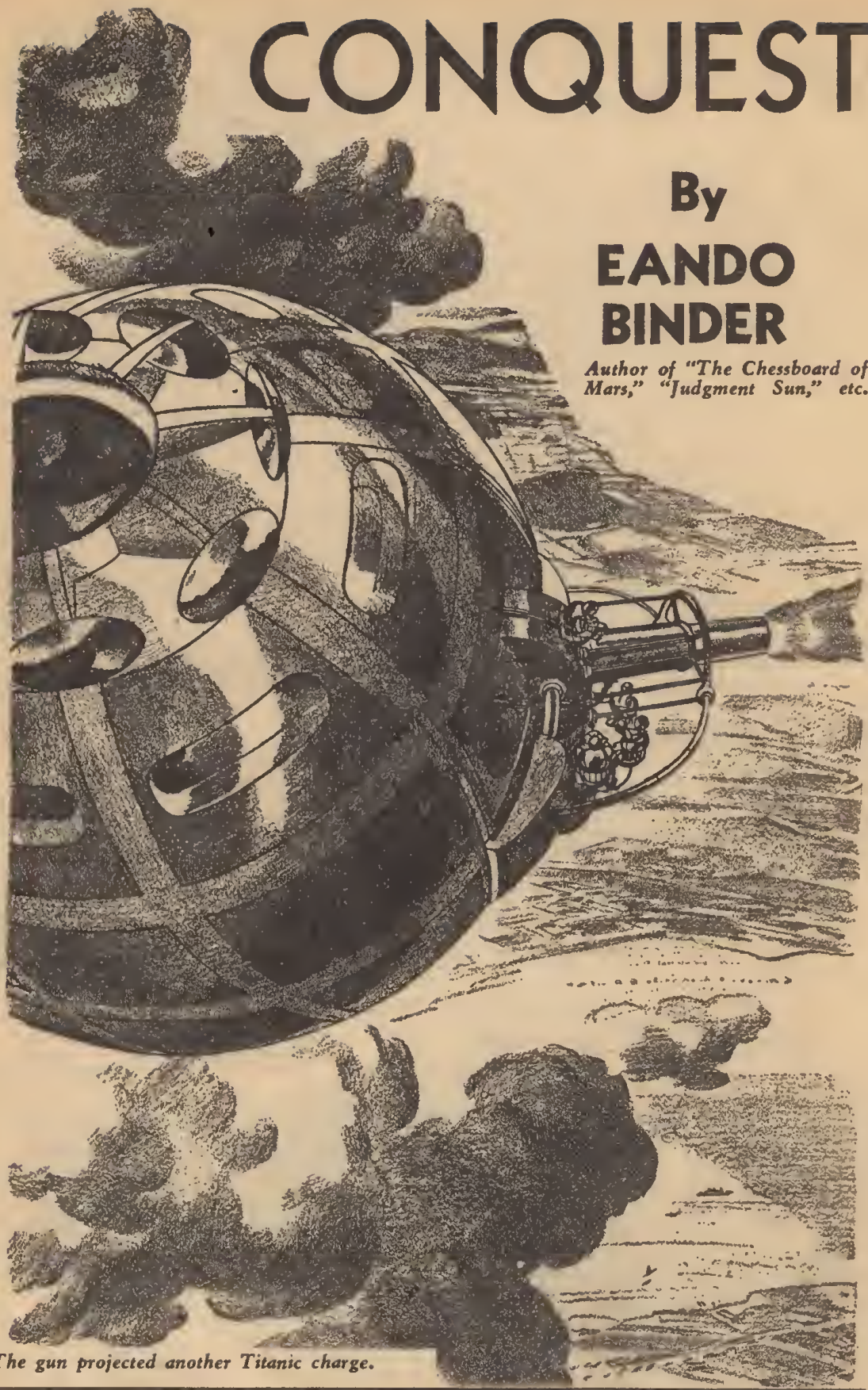
Author of "The Chessboard of Mars," "Judgment Sun," etc.



The gun projected another Titanic charge.

A Race of Scientifically Created Supermen

OF LIFE

CHAPTER I

A God is Born

THE latter half of the 19th Century was a period of scientific giants—Ramsay, Bequerel, Roentgen, Einstein and others—but history does not mention Matthew York.

While the chemists outdid nature with synthetic products, while the physicists toyed with the amazing electron and the mathematicians groped into eternal secrets of the cosmos, Matthew York searched for a great scientific arcanum.

A brain highly stimulated by chronic hyperthyroidism pushed his investigations ahead in leaps and bounds, but it also burned him out before his time. Long years of intensive search and labor eventually crystallized into results.

Like a pilgrim who at last nears his Mecca, Matthew York knew, at the end, that his fingertips were at the door beyond which lay the secret. He knew at the same time, with resigned bitterness, that he would not live to open the door more than a crack.

A Complete Novelette of Laboratory Magic

Searches for an Elixir of Immortality

"Give me ten more years!" he moaned to the Universe at large. "Ten paltry years, and I will give you back a thousand!"

But that was not to be, and Matthew York, like Columbus, was to die unknowing that he had reached the shores of a new land, though he had seen them in the distance.

AT twenty-five, Anton York, the son of Matthew York, was tall, physically perfect, mentally alert, with a budding scientific career already launched. At thirty he was healthier, if possible, and deep in the intricacies of electromagnetic waves applied to destruction. He sought a weapon so deadly that its use would teach the utter futility of war.

For Anton York had been in the World War. His grim experiences in that inferno of hate had left festering scars on his sensitive mind. He searched with all the passion of a fanatic for a Jovian weapon that would either end civilization or bring it everlasting peace.

Gradually it became apparent to him that he must be singularly blessed with physical good health. At times he wondered vaguely about it. It was hardly natural. Long hours in the laboratory, weeks of intensive, mind-shattering labor failed to weaken his superb vitality.

At thirty-five he reached his prime, with not a day's sickness behind him since childhood. Is was as though some diligent guardian angel kept him free of the diseases that exacted their toll of all others around him. His researches had resulted in the development of a fused beam of ultra-sound and gamma-rays—the long-sought goal.

Yet he did not reveal his discovery. It was too destructive, too likely to bring about chaos. He shelved it in utter secrecy, destroyed all recorded data, kept only the key formula in his mind for future use.

In conjunction with this ultra-weapon he also developed a super-refractive alloy which he patented for a small fortune. Thereafter he did not have the annoyance of financial insufficiency to hinder his personal researches. He abandoned the academic duties that had previously earned him a livelihood, and settled himself in his own laboratory.

At forty-five he had not aged at all, it seemed. He married a young and beautiful girl of twenty-five, one who instinct told him would not hold him back in his scientific endeavors. They looked like a well matched couple of equal age, for York seemed possessed of that elastic youthfulness with which some people are so fortunately endowed. Yet at times he caught himself wondering whether it was fortune or something else.

Ten years of research on liquid and solid rocket fuels had convinced him space travel would not be achieved by that clumsy, wasteful means. The answer, if answer there was to be, lay in solving the secret of gravitation.

At fifty-five he had made some steps, purely theoretical, toward the solution, but realized it might take several lifetimes to reach the fundamental basis necessary for an enduring analysis. He was like Anaxagoras, who had conceived an atomic theory, two thousand years before mankind had had a science capable of testing it.

"Vera," he said to his wife one day as she brought sandwiches to him in his experimental laboratory, "gravitation is like a planetary hypnotism, just as amazingly effective, and just as intangible. Just what it is I haven't yet determined, not even in theory. As far as I've gone, it seems to be a directive field of attraction between masses of matter. By directive, I mean radiating from points, rather than just filling space haphazardly, like the cosmic rays. Now there's a strong clue—"

VERA interrupted him. "Yes, dear, but drink your coffee before it gets cold."

"Vera, that clue is a will-o'-the-wisp I've been chasing down for ten years without success," he persisted. "It is very likely to take ten more tens of years. If only I had another lifetime ahead of me!"

"To look at you, you have." His wife was not merely flattering him. Her

voice was serious, vaguely troubled. "I'm just thirty-five, and that's the age you look, yet you are fifty-five."

"I know, I know," murmured York, without elation.

"If it keeps up," Vera's voice wavered, "I'll be looking older than you in

a few more years. Everybody comments on your youth, dear. They even call you a Dorian Grey—only in looks, of course, not character. Why, Tony, what—"

York had dropped his sandwich, fingers nerveless. His face was pale.

"If it keeps up!" he cried, repeating his wife's phrase. *"If it keeps up!"*

"Tony, I don't understand."

"Neither do I," York told her earnestly. "Vera, I haven't spoken much about my childhood, but there's one thing that has haunted my subconscious mind like a vivid dream—the night when my father inoculated me with a solution that made me very ill for a month. It was a glowing liquid, that solution, as if a diamond had been dissolved in it. He called it an Elixir."

York's eyes grew misty with past memories.

"My father was a great scientist, greater than the world ever knew. He set himself a goal—the secret of life. He did strange things with mice and fruit flies, with his serum. Once he dipped some inoculated mice into a bath of deadly germ-laden fluid. The creatures lived on, undiseased."

He sprang up.

"In the name of God, what did his serum do to me? Why should I alone be free of disease? Why do I look like thirty-five at the age of fifty-five? What does it mean? I must find out!"

"Find out, but how?" ventured his wife. She was always awed by her husband's immunity to disease and senility, but she had trained herself to ignore the subject.

"From my father's diary, perhaps, or from his research notes. My aunt still has his papers. I've neglected to make a careful study of his notes. Now I'm going to make a thorough search for some clue to the mystery!"

CHAPTER II

Life Everlasting

BUT it was not just a clue that York found as he meticulously examined Matthew York's voluminous data. It was the keystone of his quest itself. The entry in his father's diary for the day Anton York remembered so vividly, read in part:

Although it was against my better judgment, some madness seized me this night, and I injected 10 c.c. of a 50% water solution of the Elixir (leaf 88A, book G-4) into Tony's left arm. I don't know what the result will be. God! I just don't know. No use to curse myself any more. It's done and only the future can give answer. In about six months, blood tests of Anton will indicate to what extent the Elixir has taken effect. Its cruder form, when it didn't kill my guinea-pigs, gave the sign of total disease resistance within that period. So in a half year Tony will either carry blood of high radiogenic capacity, or he will be dead. Dear God, not the latter! One thing I cannot get out of my mind is that my Elixir has connections with longevity.

Number 277-B-3 of my guinea-pigs, after inoculation, lived twice the normal span of life. And that was with the crude C-4 Elixir. Is it possible that in protecting protoplasm from disease by increased energy of radiogens in the body, the Elixir also prevents the decay of vitality? Preserves youth perhaps? If so, what will my Elixir M-7, just perfected, do to my Tony? Increase his life span, perhaps, to—no, I won't speculate. I am a scientist, not a prophet. Yet there

must be some factor of longevity in the Elixir.

Longevity!

That word burst like a bomb in Anton York's brain. But he refused to allow his thoughts to carry on a train of speculation. Instead he searched out the "leaf 88A, book G-4" mentioned. Crabbed chemical formulae gave a compound labeled: "Grignard Reaction on the chlorinated union of zymase and pituitrin—in Elixir M-7."

Though not acquainted with the more technical phases of organic chemistry, being a physicist, York knew that zymase was an enzyme, a substance which could regenerate itself in the proper environment, though not a living material. A short search in his library gave him an idea of the properties of pituitrin. It was a gland product, controlling growth, keeping it even with the constant tearing down of protoplasm.

Growth and regeneration. Matthew York's formulae seemed to have combined these two biological factors. York puzzled over these for a while, then turned again to his father's diary. There was only one other entry after the one he had read. A month had been left blank. That was the month Anton York had been so ill from the injection. On the eve before his sudden death from heart failure, Matthew York had written:

Little Tony, thank God, is out of danger now. He is resting well, poor boy. I made a blood test today. Nothing definite. There is some slight increase of the radiogen value, though. I have just had the thought today that the longevity factor may be due to—simply—increased cosmic ray consumption. One of the unproven corollaries of the Radiogen Theory is that those invisible bundles of energy derive their power from the cosmic rays which fill every part of the Universe—every nook and corner of it, even the spaces between atoms. It is so astonishingly logical when one thinks of it. The countless radiogens which exist in and motivate protoplasm—give it "life"—are known to carry within their nuclei temperatures comparable to those of the stars, up to 6,000 degrees centigrade.

Cosmic rays, in turn, are electromagnetic waves of tremendous power and penetration. It is not fantastic to conceive of these constant rays losing their immense power to the radiogens, which are web-traps, like electromagnets. Now if resistance to disease—and I have almost proved it so—is the electrocution of germs by radiogens which they touch, an increased radiogen-content is a panacea. It has worked with certain of my guinea-pigs, mice and fruit flies. Pray God it works with Tony. Secondly, if old age is the waning capacity to manufacture radiogens, my Elixir is a drop from the Fountain of Youth, because its constituents are able to procreate themselves in protoplasm indefinitely.

And of course, there are my Methuselah fruit flies. A month ago, after inoculating Tony, I segregated those ten insects, gave them the same Elixir M-7, by inhalation, and they are still living, even though I did not feed them.

Normal fruit flies do not live more than fourteen days without food. Still I will not speculate in the case of Tony, except to say that if his radiogen-content is more than twice normal, he may well be—immortal! That is simply adding two and two to make four. I looked long at my boy today, wondering. He doesn't look any different, nor should he. But he may be—yes, I dare to think it—immortal!

Immortal!

If his radiogen-content was two times normal, he was incapable of dying either from disease or old age, both of which were results of deficiency of radiogens, according to the theory Matthew York had followed. Was this why he failed to grow old?

Examination of various other portions of his father's notes began to convince him it was. For the elder York had specified several times that an organism rich in radiogens, and capable of keeping up the abnormal supply, would reach its prime of life and stay there.

Gradually it became clear to Anton York as he read on. Living matter was a complete chemical entity in itself. Its "soul," or "life," came from the ultra-microscopic radiogens, like tiny batteries, which activated it under control of neuro-impulses from the brain.

The energy of the radiogens came from space, from the stars. When the Universe had been young, there had been more cosmic radiation, from the birth-throes of stars. Nature, with such a lavish supply of life-energy, had created a wide variety of life, but each with only enough radiogen-content to animate it properly. With the waning of the Universe, and the decline of cosmic radiation, Nature had increased the radiogen-content in inverse proportion

in order to continue its original cycles of life.

But here was Man stepping in. Here was Matthew York defying Nature, outrunning Evolution. Here was Anton York, with a twice normal capacity of utilizing the life-giving cosmic radiation.

Here was immortality! Because, not until the Universe had run down to half its present rate of cosmic radiation would Anton York be included in Nature's immutable laws of the cycles of life.

And that would not be for millions of years!

York grew dizzy with the thought of it.

"Bah!" he said suddenly, to himself. "Here I am talking myself into this thing without proof of any sort. I can't be sure that I have more radiogens than normal. I can't know that the Elixir worked on me. I can't even be sure that he succeeded as he hoped with his serum, for he wasn't absolutely certain himself."

This line of thought eventually led him to visit a famous blood specialist for a test. With a throbbing heart he waited to hear the result. The doctor finally reported that his blood was quite normal except in one respect—it had a singularly great germ-killing power. Twice as much as normal. He assured York that he would never be ill if his blood stayed that healthy.

York's eyes glowed like ingots of molten metal.

"Then that means my radiogen-content *is* doubled!"

The doctor frowned, then laughed.

"Oh, you mean according to the electromagnetic theory of life? That theory isn't credited, you know. In the accepted parlance, your blood simply contains twice as many phagocytes, the germ-killers. Radiogens make nice, scientific talk, but don't exist. If they did, life would be a matter of volts and amperes. We would have electrically rejuvenated people walking around and living forever." The doctor laughed heartily. "Think of that."

A SORT of paralyzing calm came over York, along with the conviction that the doctor was wrong, and his father right. A voice seemed to beat in his brain, telling him that his suspected immortality was not altogether mythical.

"How old am I?" he questioned him.

The doctor looked him over, though surprised at the question.

"I'd say about thirty-two, not more than thirty-five."

"I'm fifty-five," stated York. "And a hundred years from now I'll still be looking thirty-five." He left the gaping doctor, went out into the street. He stared at a tall, sturdy skyscraper. "You're strong and enduring," he said to it quietly. "You'll last fifty, a hundred years. I'll outlast you and your successors." To the river under the steel bridge he murmured: "Some day you will not exist, and I will stand over your dried bed." To the fields he whispered: "You will nurture many, many crop cycles, but some day you will be barren. On that day—I will be thirty-five."

NIGHT came and to the bright stars he hurled a challenge: "The eternal stars, eh?"

Hours later, in a rosy dawn, he came to himself. He found himself far out in the country, and realized he had been walking in a daze, drunk with the thought of immortality. Vera was waiting for him when he arrived home, tired and muddy.

"Tony! I've been worrying."

York looked at her strangely. A thought struck him, one that had persisted before.

"Yes, I've been worrying too. One little worry stuck with me all during last night, even in the heights of my fancy. That thought is losing you." He pulled her to him suddenly, fiercely. The love he had for her was deep and vital.

"I love you madly," he cried, "but I'll lose you, unless—"

"Tony! What are you saying?" Vera's eyes became haunted with fear—fear for his sanity.

"No, dear, I'm all right," York said quietly. "I can't explain now, but soon I shall." His eyes shone then. "Soon you and I—together—"

CHAPTER III

The Experiment

"HM, I don't know if I can duplicate it. The main part of the serum is not so intricate, but this one ingredient is new to organic chemistry. Look at it. If you know anything at all about my field you'll realize that combining zymase and pituitrin, a chlorinated enzyme and an acidic gland product, is impossible. I don't think it can be done."

The speaker was Dr. Charles Vinson, a skilled technician of the biochemical sciences. He and York had been acquainted academically twenty years before.

"You must duplicate that serum!" York's voice trembled with desperation. "I can't be as frank about this as I'd like, Dr. Vinson, but the manufacture of that serum means more to me right now than anything in the world. Try it, anyway. Work here at my laboratory for a month, a year, and name your price."

"Oh, it is not the money," protested the biochemist. He did not quite mask the inherent cupidity of his nature, however. His eyes gleamed with sudden interest. "It would cost much. Your place here is equipped for electrons and volts, not bacteria and guinea-pigs. I would have to buy much—"

"Then it is agreed," declared York. "At any cost, make me 10 c.c. of this Elixir."

"Elixir!" Dr. Vinson's whole manner changed. "Elixir, did you say? Where did you copy these formulae? What do they represent?"

"Bluntly, none of your business." York could not hide a trace of anger. He had never particularly liked the biochemist. For a moment he was sorry he had picked him. Yet he knew it would be difficult to find a more capable man for the task.

Dr. Vinson shrugged. York went on: "You will be paid for duplication of the serum, nothing more. Look over this chemical annex to my laboratories. Whenever you are ready, come to the library. I'll discuss terms and procedure with you." He wheeled about and left.

Dr. Vinson studied the sheet in his hand. It was a typewritten copy of someone's research notes. Whose? What did they represent? An Elixir? Further pondering suddenly enlightened him. Matthew York—Anton York: father and son. Many years before Matthew York had published a short treatise on the secret of life. He had claimed that an electrical interpretation of life was the only approach to its mystery. He created a small furor, and his paper became the forerunner of radiogenic theory. Yet nothing more had been heard of Matthew York.

Except perhaps this. Dr. Vinson held up the sheet, wondering.

That same day York spoke to his wife eagerly. For the first time he explained to her fully the secret of his youth—the immortality of his flesh. She was not so surprised as she might have been. She caught her breath sharply, though, when he added: "And when Dr. Vinson makes up some of the serum, it will be for you! You and I will have each other forever in perpetual youth, in our prime of life!"

She was suddenly in his arms, sobbing.

"I will love you for all eternity!"

IN the next month York's laboratory became the receiving end of a small caravan of new materials. Varieties of chemicals, crates of apparatus, cages of squealing guinea-pigs. For Dr. Vinson had seen at a glance that the serum was not to be an elementary accomplishment.

In another month he had started to gain results. York came often to watch him work. He seldom spoke. His attitude was one of waiting, and impatiently. Sometimes his wife was with him, and they would watch together, smiling at one another secretly.

Vinson did not give up trying to draw out York in conversation about this mysterious project.

"York," he complained one day, "there's something missing in the data I'm working on. I'll have to have it all. Where are the original notes?"

"Why do you need them?" York countered hesitantly.

"Because something I need may be in them. Some little thing you neglected to copy, but vital to successful duplication. Look at this guinea-pig. The serum killed him, as it has all others, because it is not the right serum."

York faltered. Some instinct had kept him from showing his father's notes up until now, for they dealt with a tremendous thing. Yet he wanted the serum. And because the Infinite did not warn him, he yielded. But only the scientific notes, not the diary.

Dr. Vinson's over-eager hands leaped the yellowed pages. His eyes glittered first, then narrowed. A pattern was piecing itself together in his mind.

Not many weeks later the biochemist's face was bright with triumph. Together with York he watched the healthy antics of a guinea-pig into whose veins the day before had been injected an overdose of bubonic plague germs.

"That little animal is germ-proof!" announced Vinson excitedly. "It has passed the last test. It is immune to any but violent death. We have the same serum now that your father developed."

York turned swiftly.

"My father! How did you know? What—"

The biologist smiled thinly.

"Why beat around the bush, York? Your father developed this serum and tried it on you. It was dangerous, because the serum was fatal half the time. Yet he took the chance, knowing that if you survived, you would be immune to disease." His face changed subtly. "And immortal!"

"Damn you!" cursed York, stepping forward.

"Wait, York. I haven't been spying around. The thing stared me in the face. You, who should be as old as I am, fifty-five, look like thirty-five. Then, I can show you a fruit fly that has lived twice its normal span and will continue to live—who knows—through all eternity. It astounded me until I reasoned it out."

York relaxed. After all, it was too tremendous a secret to conceal from the man who had worked with his father's notes. He stared at the biochemist uncertainly. What would this mean?

Dr. Vinson laughed shortly.

"You are an immortal, York. And you love your wife. You want her by your side in the long future that beckons. Hence, my work here—to manufacture the Elixir, for her. Well, let me warn you—there is an even chance that your wife will not gain immortality, but death!"

"I'm going to take the chance," York said. "Prepare a suitable dose for injection. In case of death—"

HE made a resigned gesture. "Vinson," he continued, solemnly, "you and I share a great secret. The Fountain of Youth! An age-old dream come true. After my wife has been inoculated, we'll have to discuss—many things. This Elixir can be a great gift to civilization, to mankind. In my own case it will allow me to finish my researches, to solve the secret of gravitation, which I could not do in one lifetime. But certain problems would arise if the Elixir were given to the world. You can guess them."

Vinson did not answer. His small eyes blazed with the dawning gleam of some staggering idea. York noticed the sudden stiffening of his body, spoke sharply.

"Well?" It was a challenge.

The biochemist's dry lips parted but no sound came. Then with an effort he gasped: "Death! If your wife dies, think of the responsibility, the guilt!"

If York had not been so preoccupied with his own problems, he would have demanded the truth. For Vinson had not spoken what was crawling in his mind—something of far greater significance than the mere fate of one woman.

"The responsibility is all mine," snapped York. "I have her full consent to this. We have also made out a legal document absolving me from all blame in case of her death under the serum. According to law, this is not contestable in court any more, so long as the parties concerned are mentally sound. You are not an accessory to a crime in any sense, for there is no crime. When can you have the stuff ready?"

"In about three days," answered Vinson, voice curiously hushed. His face looked fevered; his hand trembled. "You see, I want to do my best with the serum for your wife. Purify it as much as possible. Increase the odds in our favor."

York put a hand to the biochemist's shoulder.

"Come, don't take it so hard," he said, vaguely aware that the man was more than normally moved.

Vinson smiled weakly. York left, to tell Vera of the near approach of the great moment when they would look down the interminable hall of the future together. When the door had closed behind him, the biochemist's face gave way to pent-up emotions he no longer had to hide. A twisted smile came over the thin lips that hissed, "Fool!" in the direction of the vanished York.

If there is some repetitious twist to the workings of fate, certainly it became manifest in the events that occurred three nights later. For in broad detail it was the ancient story of eternal love, of Romeo and Juliet, re-enacted.

Tall, handsome, physically perfect, Anton York stood over the body of his wife, his face marked with grief. She lay on a couch, her beautiful face molded in the peaceful lines of death. Dr. Vinson stood to one side, like a dumfounded Belthasar, breathing hard. He stared mutely from the hypodermic in his hand to the pair before him.

Just a few minutes before, with York holding his wife's hand, he had injected the serum into her arm. The reaction had been sudden and startling. Her breathing had grown hard, her eyes had flown wide. With a little half sob and half smile to her husband, she had fallen back on the couch. Then a few racking gasps, after which an ominous stillness had come over her relaxed form.

VINSON dropped the hypodermic and stepped beside the couch. He leaned over to listen for heart beats. Then he looked up.

"Dead!" he whispered huskily. "The odds were not quite even, for her!"

York's face was a blur of overwhelming, repressed despair. Though Vinson had repeatedly warned him that this could be the result, he had not been prepared for it. He dashed from the room suddenly, without a word.

Alone with the body, Vinson stared at the sweet face somewhat fearfully. It shook his resolve to try the Elixir himself, which was necessary for the furtherance of certain plans he had made. Immortaliy or death! Was it worth the risk?

York suddenly burst into the room, face pale and desperate. Ignoring the biochemist, he dropped to his knees beside the couch. For a long moment he gazed at the face so dear to him. Then, with a swift motion he brought one hand up toward his mouth. Vinson caught the glint of glass, uttered a strangled cry.

But it was already done. York gave him a wan smile.

"Cyanide," he whispered. "That is a better Elixir for eternal life." A minute later he slumped across the body of his wife, pale blue around the lips.

Dr. Vinson gaped at the double tragedy. For a moment he was weak with horror of death. But presently he straightened up, smiled.

"Perhaps it is better this way," he mused. "York might have resisted my plans. He is—was—the altruistic sort. He would not have approved, I'm sure. And I had determined anyway that nothing was to stand in my way."

He laughed shortly. "The fool! With the greatest gift mankind ever had in his hand, he thought only of making his wife immortal. I suppose later he would have envisioned centuries of research for himself—to benefit mankind. He could not think of the important thing—power! The power of immortality! But I think of it. Yes. First, I'll purify the Elixir further—give myself a greater chance to survive it. Then—"

He broke from a trance, whirled about.

"Got to get out," he told himself. "I must not be connected with this affair. I must be left alone—to think, to plan, to build." He rolled the phrase on his tongue, eyes gleaming with a fanatic fire. "I'll change my name. Get all

my money together and leave the country perhaps. Build in secret. This marks a new phase in my life, and in the history of the world!"

He turned once more to the still forms on the couch. With the sense of melodrama still upon him, he whispered: "We shall either meet again soon, in eternal death, or *never* in an eternity!"

CHAPTER IV

The Immortals

DR. VINSON left and made his way to the laboratory in which he had duplicated the Elixir. Here he heaped all of Matthew York's notes on the floor, set fire to them. In his brain was locked the great secret of the serum. On sudden thought he took a gallon jar of alcohol and rolled it toward the burning papers. He watched until the heat cracked the glass and sprayed liquid fire over the floor. The flames licked at the wooden workbenches, grew to a vigorous blaze.

Vinson turned away with a dark smile shadowing his face.

"From these ashes will spring my immortal empire!" he cried aloud. Then he left the place.

The eager flames became a yellow holocaust in the big building that housed the laboratory and home of Anton York. But fate had not played out its re-enactment of history's Romeo and Juliet. In the room where a double tragedy had seemed to occur, there was a stir of life.

Vera opened her eyes and struggled to sit up on the couch. Her husband's body slid away, fell to the floor gently. Her horrified eyes saw this and with a scream of terror she fell back again, pale as death.

But it was not the dagger-death of Juliet. She had only fainted. When York opened his eyes a moment later, his mind was an aching blank. A rush of memory brought him to his feet with a groan. He stood there a moment, trying to fathom his escape from death. He could not know that the same super-electrical quality of his flesh which resisted disease and supplied the energy of youth was also able to fight the fatal fire of life-poisons with its own youth-fires.

A thick cry of unbelief escaped him as he saw that his wife was breathing. There were two fevered spots of red on her marble cheeks. Death had passed them both by! Again it was an enigma to him that the powerful serum, producing a temporary coma, like that before death, had finally eased its stricture of the heart and lungs and allowed life to continue in her body.

A curl of smoke under the door warned York of the danger. He swung it open and as quickly closed it as a cloud of smoke swept into the room. He picked up his wife in strong arms and ran from the building. There was a faint dismay in his heart over the loss of the laboratory, but a far greater joy that they were alive. And alive as immortals, both of them!

A month later, in a hospital, York's tired eyes lit up happily.

"The danger is over, Vera," he told her. "You went through the same period of illness that I did when my father gave me the serum as a child. It's like the fevers that follow vaccination. But it's over now, and you and I together can look down the centuries!"

Three months after this, in a hotel, Vera asked about Vinson.

"Dr. Vinson disappeared in the fire," York told his wife, "and I'm worried about him. I can't rest until I know where he is. He alone has my father's secret—the original notes were destroyed together with all copies. What is he doing with the Elixir? I can't help feeling concerned, beeause he is not the man to use such a thing wisely."

A YEAR later, he said resignedly: "I guess there's no use to hunt him further. I've employed the most expert detectives, but they've found no trace. Wherever Vinson has gone, he's covered his trail completely. And that's ominous. Again, he may have tried the serum and died from it. I wish I could hope that."

Two years later, York proudly surveyed his new laboratories, located in

a remote part of the mountains. It was made possible by one of his inventions. A large industrial concern had patented his super-magnet, a by-product of his pervious researches in gravitational phenomena.

"Here," he predicted, "I shall solve the secret of gravitation."

Five years later he had come to the conclusion that gravitation exhibited lines of force, much like a magnet. "What is wrong with the analogy of converting kinetic motion into electricity by cutting the lines of magnetic force?" he asked himself. "If the field of gravitational force is similarly cut—yes, but with what?"

Ten years later, he frowned at a new snag in his researches.

Ten years after that, with careful planning, he and Vera changed their names, to circumvent explaining their permanent youth.

A decade later they had achieved a harmony of continued existence, and mortality seemed a dream in their past.

Time swept by. Its rolling pace did not change the couple in their mountain laboratory-home. They were still thirty-five in appearance and vigor. They lived in a state of detachment from the rest of the world. From the sidelines, they watched the kaleidoscopic march of events, the unfurling of history. Strikes, famines, elections, social changes, shifting national boundaries, new inventions — their televisor kept them informed.

York's experiments took him into a field wholly untouched—the phenomena of the gravitational lines of force. A field as untouched as the electromagnetic scale before Newton and his successors explored it. It had taken over two centuries, and a host of diligent savants, to understand radio waves and cosmic radiation, the limits of that field. York labored to explore his field alone, and in less than two centuries.

In a way, York was equal to a line of scientists following one goal. Each time he reached some hiatus and had to branch away. He was like a new worker taking up the work another had left in death. And he had the advantage of always being in perfect condition, physically and mentally.

Thus it was, that a task that normally would have required all of a thousand years of science fell before his irresistible onslaught. He called his wife in excitedly one day.

"I've cut the force-lines of gravitation," he sang triumphantly. "I use light-beams, curved ones, for the energy source. I feed them into the quartz coils, like electricity in a helix of copper wire, to create a magnetic field. A magnetic field is used in opposition to another magnetic field to produce kinetic motion. My quartz field produces a gravitational field, in opposition to Earth's gravity, to produce kinetic motion. Unlimited kinetic motion—direct from Earth's gravitational field!"

YORK'S voice became a paean of enthusiasm.

"It is the answer to space travel, if I can refine my apparatus to the point where a single beam of direct sunlight will actuate my quartz rotors. I must also make a sun-charging battery to spin the rotors, so that a ship in space will need only the perpetual sunlight to motivate it. Vera, I am close!"

Close, yet it took another quarter century to achieve it. It was almost a hundred after the inoculation of Vera that York gave his ship its first tryout. It was a ten-foot globe of light metal, set with several thick quartz port-windows. Two large convex mirrors at the top were arranged to feed sunlight to knobs of sensitive selenium. Some miracle of York's science compelled the sun's radiant energy to pour into the ship like water into a funnel.

It handled awkwardly at first, until York got the feel of changing his artificial gravity fields. Then he was able to whisk the heavy globular ship about with flashing speed. It looked like a bright steel bomb from some giant cannon.

He leaped out of its hatchway, panting, after landing.

"I can't tell you how excited I am over this," he told his wife. "Think of it. We can stock the ship with necessities and go out into space, explore the other planets!"

They made a trip to the moon and

back that same year. From this experience York was able to refine his apparatus still more. They made a trip to Mars and to Venus. He began planning a trip to another star. This would require a larger ship for supplies and motors to be run by starlight and tenuous mid-void gravitational forces, and he began its construction. If his gift of immortality had made him feel like a god, this ability to explore the ether was still more of a god-given attribute.

He opened his eyes one day to realize he had been drunk with these things, as he had been with the first realization of immortality. Earnestly, then, he sat down to write out the complete plans for his anti-gravity unit. He would send this to every scientific institution of the world.

It was just before he had finished the long and complicated paper that Vera called his attention to startling news over the radio. All during the past year there had been mysterious invasions in outlying sections of the world. Mysterious, but unimportant in that they involved obscure regions. The invaders had always come in small, swift ships, equipped with incredibly destructive weapons. Many garbled reports had been received from places invaded, but no one seemed to know just who or what was responsible.

But this night, the news was alarming.

"Rome has just undergone a terrific bombing by a mysterious fleet of small, fast aircraft," an excited announcer told the world. "They may be the same ones that have been terrorizing Earth in the past year. All the world is aroused. What nation has done this cowardly thing, attacking without warning?"

York's eyes reflected again the emotions that had haunted him in the World War.

War! That most senseless of human atrocities.

"Haven't they had enough of it?" he cried. "They fought like beasts for a decade just thirty years ago. I was tempted then to reveal my superweapon and let them butcher one another to nothingness. I am tempted now."

THE next day Berlin was bombed. And in the following days, Paris, London, and Moscow. The world gasped. What mad nation was challenging all Europe? Tokyo was bombed, and then Washington. What power was challenging the whole world? A new note of terror arose when a gigantic fleet, composed of mixed Italian and German aircraft, was annihilated by fifty small ships of the invaders. The enemy seemed to have some long-range weapon that made victory ridiculously easy.

York waited for the unknown power to declare itself. Then he would act. After the succession of bombings, which had not been very destructive and had evidently been an exhibition of power, there was a lull of a day, then news that set the world on fire.

"The enemy had finally announced itself," blared the televisor. "This afternoon a powerful radio message was picked up at many official stations. The invaders that have bombed the world's most important cities call themselves The Immortals. They demand a parley of all important nations, at which The Immortals are to be accepted as the sole government on earth. In plain words, The Immortals, whoever they are, demand world dominion. This, or the threat of continuous bombing and destruction by their invincible fleet of fifty ships!"

Then York knew. He and Vera looked at one another.

"Dr. Vinson!" gasped York. "Dr. Vinson and a band of ruthless demons bent on conquering Earth. For a hundred years he planned this. I did not think he would go to such lengths. In some hidden spot he and his crew, all immortals, must have labored for this day. Undoubtedly they are all scientists and technicians. Men who in a century's time could do miracles in discovery. Vastly improved ships, superweapons, carefully laid plans. They played for big stakes and made preparations in a big way."

He turned his anger on himself.

"Why didn't I see it before this? It's all so clear now. In the past year they carried out experimental raids, to gauge their power and readiness. I

should have suspected, and prepared. Now they have struck, and the end will be soon. True scientific warfare against the world's tremendous, but clumsy armament. The wasp against the bear. It can sting again and again, too quick and small to be crushed by might."

Again news came over the televisor, indicating the crisis which faced the world. A hastily and secretly formed armada of the world's best fighting craft—of every large nation—had massed and challenged The Immortals. The challenge had been promptly accepted. The incredible story told by gasping announcers was that by sheer weight of numbers the fleet had succeeded in downing three of the enemy, while they themselves were mowed to one-third their strength. The remnant had fled.

Vera was alarmed by the sickly grey color of York's face as he heard this.

"I'm responsible," he whispered hoarsely. "I let the dangerous secret of immortality fall into Vinson's hands!" His whisper continued, but with a deadlier note in it: "I must act before it is too late."

It was the climax of his super-lifetime. Armed with nothing more than a few pages of diagrams and figures, York descended on Washington in his silent gravity ship and said he could fight the alien power. He was derided rather than laughed at, in that the situation was too grim for laughing.

CHAPTER V

The Destroyer

HOWEVER, the gravity ship could not be laughed at. And when a group of scientists was hurriedly assembled, they said the thing looked good on paper. At the same time the startling news came that The Immortals had been completely victorious in Europe and were now sweeping Asia. If Japan would fall, as must be, America would be next, as the last remaining power.

Faster than they had ever moved before, the wheels of industry, lashed by a frantic government, turned out the apparatus York wanted. He had them secretly move their headquarters to Pittsburgh. The terrible weapon he had kept locked in his brain for over a century took form here.

In two weeks it was nearly completed, but not before The Immortals, now dominant in the Eastern Hemisphere, swung their tiny, deadly fleet westward. At the first encounter, the pride of America's aerial defense was annihilated by the sweeping rays of the enemy. These rays had all the potency of a two-ton bomb at close range, yet were invisible and noiseless.

"We must surrender!" This cry echoed in the hall of authority.

"Hold out!" commanded York. "Hold out, I tell you."

They obeyed him, almost hypnotized by his blazing eyes. The Immortals, after defiance of their ultimatum, promptly began razing cities to the ground. Their supply of fuel and ammunition seemed inexhaustible. Coming from the west, San Francisco, Denver and St. Louis crumpled before the onslaught.

"Enough is enough. We must give in!" was the horrified clamor among the leaders and statesmen.

"Hold out!" screamed York. "Three more days!"

They did. In those three days Chicago, Cincinnati and Philadelphia became smoking ruins. And the invincible fleet headed for New York City!

But in those three days York became prepared. His weapon was mounted on his ship, a long snout of vitrolite pivoted on a universally jointed base. Wires led inside the ship, through hastily made rips in the hull, to the power source of the ship. By a quick change, York had fitted his anti-gravity unit to utilize Earth's tremendous gravitational field for power for the vitrolite gun.

Then he contacted the fleet of The Immortals by radio, challenged them, called them back from their course toward New York. They might have taken it as a desperate bluff to save that great city except that York made his challenge a personal one—from

himself to Dr. Vinson.

"York?" came back a voice that was recognizable as Dr. Vinson's. "Anton York? Impossible—he—"

"I did not die, Vinson. I survived the cyanide. I've been wondering if you would appear on the scene. I'd almost forgotten you in the century that has gone by. But bad pennies always show up. You've done a lot of damage, Vinson, but you'll do no more. I'll meet your fleet anywhere you say for a showdown. If you don't meet me halfway, I'll hound you to the ends of the earth —to the ends of the Universe if I must!"

Vinson's voice spluttered over the radio. For the first time his companions around him saw fear on their leader's face. What man could this York be, that their hitherto confident master feared him?

THEN Vinson spoke again: "Wait, York. I don't know what you have to give you such confidence against my fleet, but listen to reason. You're an Immortal, as we are. You belong with us, York—as rulers of Earth. I have no grudge against you. Join up with me and that's the end of it. Why should there be trouble between us?"

York's voice was a white-hot hiss in the microphone.

"You will rule Earth without me, or not at all. But first you must put me out of the way. Name the place!"

"Over Niagara Falls!" Vinson's voice, previously uncertain, rang now with arrogance and assurance. "What can you do against the fleet that has whipped a world?"

It must have semed like a battle of the gods to those fortunate eyes that saw it, especially those who had caught the exchange of words between York and Vinson.

York's ship, a bright ball of metal and glass, dropped from the clouds several miles from the fleet of The Immortals. A group of tiny black figures could be seen around the base of the vitrolite gun, precariously hung in sprung seats. These were the gunners, iron-nerved army men who knew nothing about the weapon, but who knew that when you aimed the long snout and jerked a lever, a something was released that could destroy. Other than that they had only grim determination and courage.

Like the buzzing of angry hornets, Vinson's fleet dashed for the lone ship. York's ship, high over Lake Erie, hovered like a poised eagle. The long, slender vitrolite tube swung toward the oncoming ships. Something blue and pulsating sprang from it, projected a streamer of violet across the intervening space of two miles.

What inconceivable force it was, no one was ever to know. York could have described it briefly as a combination of atom-tuned sound vibrations and electron-tuned gamma vibrations, both together able to rip matter to ultra-shreds, without revealing its secret. For it was a type of wave existing in the audio-ether transition stage between the known and the unknown in catalogued science.

But the effect was not so mysterious. A dozen of the enemy craft sagged strangely, burst into little bubbles of vapor, and changed to clouds of black dust that fell slowly toward the water below. The rest of the fleet, as one, swept up and to one side, away from this frightful weapon. Yet before they had completed the retreat, twelve more of their ships had become puff-balls of black soot.

York smiled grimly. He had purposely made the focus of the gun's beam very wide. Each time it belched forth its Titanic charge, a ransom in power went with it. But Earth could afford it, with its almost unlimited gravitational stresses that fed the weapon.

The range of The Immortals' weapons was known to be just as great, but they had not thought to use them on this lone ship three miles away. Now, however, the air droned with the concussion of atmospheric rents made by invisible streamers of their ray-forces. Their rays were amplified cathode radiations, million-watt bundles of electrons at half the speed of light.

YORK was not caught napping. His ship had already moved upward, at right angles to their position, present-

ing a target moving at a sped of five hundred miles an hour. It was cruel for the men exposed to the air around the vitrolite gun, but necessary. York flung his ship up into the clouds.

The Immortals seemed nonplussed. They scattered widely and massed their beams upward, on the blind chance of scoring a hit. When York's ship did appear, far on the other side of his former positon, it was heralded by the destruction of eight more of Vinson's fleet. Most of his ships were already destroyed and the fight had hardly begun!

Under this scene, the waters of Lake Erie boiled and rose in great clouds of steam. Niagara Falls, though York tried to avoid it, took most of one of his gun's charges, and became in one minute an unrecognizable jumble of churning waters and puffs of black vapor. Grim reminder for all time of this battle of the gods.

The Immortals fled, ingloriously, scattering wide. The swift, sweeping sword of destruction from York's ship picked them off one by one. There was no limit to its range. It hounded the last one down after a brief chase. And the menace of the Immortals was over!

The world had to content itself with honoring three of the five men who had handled the vitrolite gun, and burying the other two, dead from their ordeal. York, after landing them, had promptly departed, without a word to anyone. Without waiting for thanks and praises. Like a god he had come and like a god he left.

AND like a god he went out into the void not long afterward, with his wife, leaving behind him the legacy of space travel. The secret of the superweapon went with him. The secret of immortality was no longer his to give away. Earth had had a god, one who had nearly destroyed it, and then saved it. One who had shown the way to other worlds. One who had exhibited an awesome weapon to warn mankind what its warfare could lead to. One about whom many legends were to be woven, true and false.

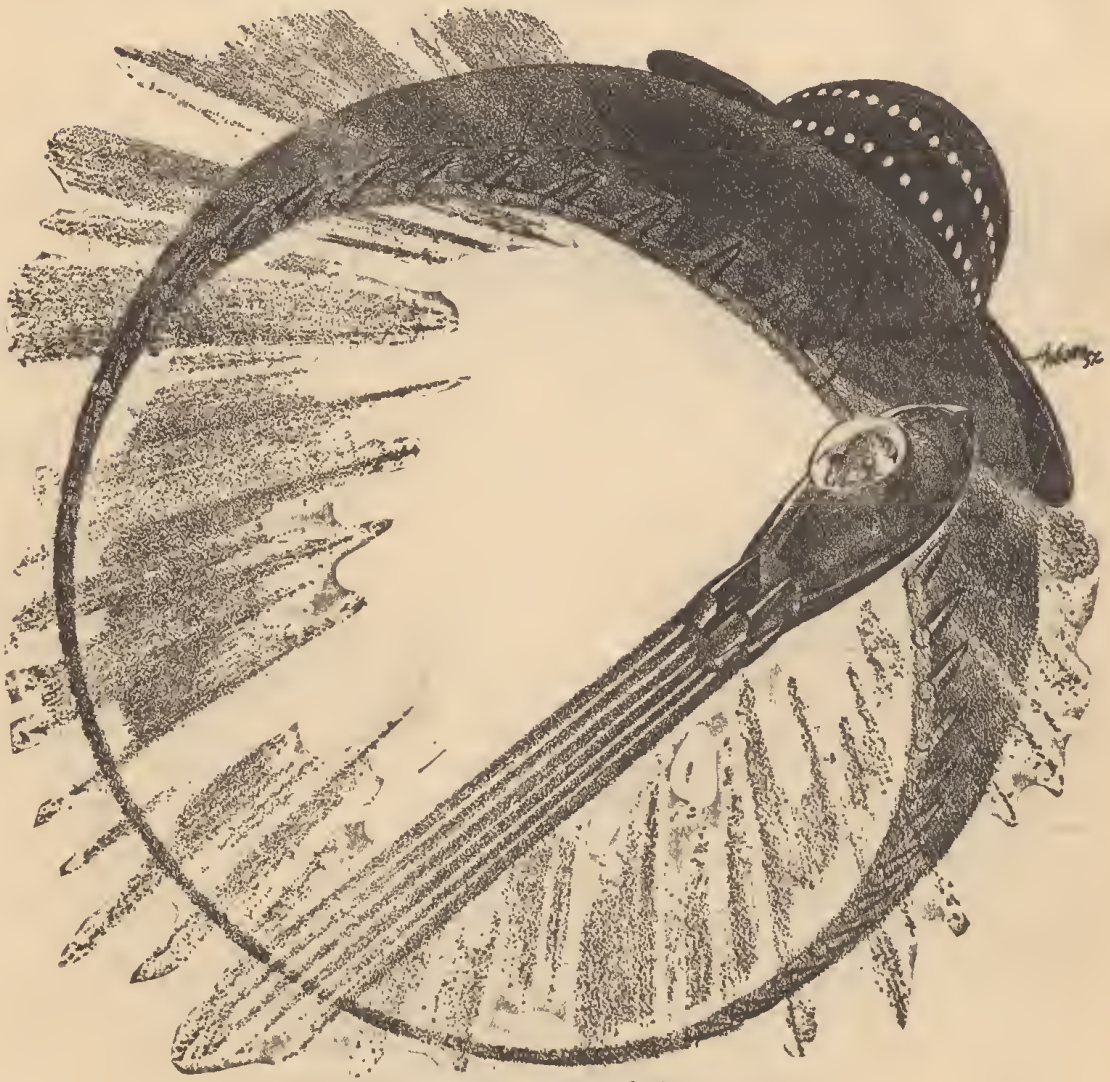
But now the god was gone—forever. Once given a taste of the supreme freedom of the void, he could not return to the pettiness of Earth. Nor did he care to interfere in any way, altruistic or otherwise, in its normal course of affairs.

On and on he went, he and his immortal companion. Their understanding and wisdom grew to cosmic heights. They visited many worlds, many suns. Time meant nothing. They discovered the secret of voluntary suspended animation, requiring no food or air. They became truly gods.

Somewhere in the dim future ages he must die, this man-made god. Sometime when the scales of Time have sufficiently lowered the amount of cosmic radiation which gives the god life.

Next Issue: THE SPACE-TIME-SIZE MACHINE—
a New "TUBBY" Story by Ray Cummings

The Mighty Solar Machine that Meant Safety to Humanity was in Danger—and Only the Terrestrial Secret Service Could Protect the Earth!



The great mirror concentrated the sun's rays.

SPACE MIRROR

By EDMOND HAMILTON

Author of "Cosmic Quest," "The Man Who Evolved," etc.

THE sleek little space ship sped through the black gloom of the great void like a flying metal torpedo. Twenty thousand miles behind it bulked the huge, grey, cloudy sphere of Earth. Ahead—

The worried, tense young pilot at the controls of the little ship pointed ahead through the glassite observation wall. His finger indicated something to his single passenger.

"There's the mirror," he said. "We'll

reach it in an hour.

Rab Crane, the passenger, stared. His bronzed, aquiline face stiffened, and his keen black eyes widened in surprise.

"Lord, I didn't realize it was so huge!" he muttered.

"It's big, all right." The pilot's troubled eyes surveyed the thing ahead. "Three hundred miles across—the work of decades—the greatest achievement any planet has ever conceived. And if it's wrecked now—"

"It's not going to be wrecked!" Rab Crane's firm mouth was set like a steel trap, his eyes glinting in determination. "The Terrestrial Secret Service sent me out here to find out what or who is threatening the mirror. I'll do it, or else—"

The determined expression still stamped on his keen face, the TSS man continued to stare as the little space ship drew gradually closer to the colossal thing that floated in space ahead.

It was a staggering sight. A huge concave mirror, it floated in space like a satellite, slowly revolving around the rotating Earth. Its concave, inner face always turned toward the south polar regions of Earth, and also toward the glaring sun. A protective, protonic barrier enveloped the mirror and deflected all oncoming meteors.

The mighty mirror, catching the sun's rays in its vast concave, was throwing them back toward Earth in a concentrated beam of tremendous brilliance. It made a terrific shaft of incredible radiant heat that was focused upon a certain spot in the icy Antarctic. There it struck heat engines capable of generating unlimited power for Earth. It was a mighty power project, the work of years, and would give Earth complete power supremacy in the Solar System—if it were not wrecked.

If it were not wrecked! Yes, there was the menacing shadow. There were, among the other eight independent planets of the System, worlds that would like the project to be destroyed. Mars, Venus, Mercury, Jupiter—old enemies of Earth, jealous of its ancient wealth and prominence. Which one of them was now trying to sabotage the project, using the weapon of hideous murder? He'd have to find out, Crane resolved again. The Chief had sent him to find out, and a man of the TSS carried out the Chief's orders—or didn't come back.

The pilot was heading the little space ship to overshoot the great mirror's edge.

"We go over it and around to the back," he explained. "The control rooms, work shops, barracks and all are in the air-tight dome on the back of the mirror, you know."

Rab Crane nodded silently. The space ship crept over the edge of the mighty concave, dropped swiftly down along its black, convex back. Built onto the rear was a large domelike structure from which jutted a broad landing platform.

The pilot dropped the little ship skillfully onto that platform. A tubular gangway shot out from the wall of dome, making air-tight connection with the ship door. In a moment, Rab Crane and the pilot stood in one of the compartments of the air-tight dome.

Officers stepped to meet him, the foremost a tall, brown-faced, thin and worried man of forty.

"Mr. Crane?" said the thin officer. "I'm Major Morrow, second in command here."

He indicated two other officers, a chubby, bald, pink-faced captain and a dark, sullen-looking young lieutenant.

"Captain Britt, our chief medical officer, and Lieutenant Laver," he said.

Rab Crane acknowledged the introductions.

"Where's Colonel Ames?" he asked crisply. "He commands the mirror now, doesn't he?"

Major Morrow nodded nervously.

"Yes, he's commanded since the murder of General Bray. I'll take you to him."

HE led them up through the other two floor levels of the dome. They passed a maze of artificially lighted compartments, machine shops, barracks. The maintenance crew of the mirror, fifty men in all, was at various tasks. Ventilation pumps throbbed incessantly. Earth's gravitation held them to the floor, even out here.

Morrow was talking, the worry of days spilling from his lips.

"Two men have been murdered here, in some hellish way. General Bray, a week ago. And a rocket-technician, the same day."

"Rocket-technician?" Crane repeated.

Morrow nodded.

"The mirror is equipped, you know, with rocket-tubes set around its rim, so that if necessary its position in space can be changed at will. This man was head technician."

"I never saw anything like those two murdered men. It was horrible," said Captain Britt, the chubby medical officer.

They had climbed a stair to a corridor on the dome's third floor. Major Morrow knocked on a locked door.

"Colonel Ames' office, from which the control room opens," Morrow explained. "Ames has kept himself locked in lately. Afraid—afraid of whatever killer is at large here at the mirror."

"One of the fifty men here in the dome," the chubby medical officer muttered. "A killer, doing this for some reason—"

There was no answer to the knock. Morrow looked startled. He rapped again, more loudly, and called. Still came no answer.

"Something's wrong!" Morrow cried. "Colonel Ames is in there but he doesn't answer. Laver, get men to break the door."

"Wait, this is quicker," snapped Rab Crane. His beam-tube had leaped from his pocket into his hand. "Stand back!"

The thread of blinding blue force from his tube lashed out and hit the lock of the metal door. Beneath the needle of terrific force, the metal began to melt and run.

Crane snapped off the beam, drew back and hurled himself against the door. The half melted lock snapped and the door burst in. The four men stood petrified for a moment as they stared at Colonel Ames, sitting there at his desk facing them.

"My God!" cried Morrow, his face ghastly. "Ames too—he's been murdered!"

"The same—as the others—" Britt choked.

Colonel Ames had been a tall, distinguished man. But he was a hideous sight now. His body was a withered, dry, brown mummy, as though he had been dead for thousands of years.

Rab Crane sprang forward. "The 'dry death!'" the TSS man hissed. "Someone poisoned him with it!"

The other three stared in horrified stupefaction.

"It's the most ghastly poison in the Solar System, little known," Rab Crane swiftly explained. "It's a hellish infection from the deserts of Mars that runs through the body like flame, dehydrating it, destroying every molecule of water in it by a chemical process akin to electrolysis."

Crane rapidly examined the brown, withered body of the dead commander. He found on one leg a spot that was darker brown than the rest of the parched skin.

"That's where the stuff was shot into him," he rasped. "But how did the murderer get in here?"

"God, how could he have got in here?" Major Morrow said hoarsely. "The door was locked from inside. There are no windows in this office, either."

Crane strode across the office to a heavy door, sealed hermetically tight like a ship's air-lock. It was locked.

"That's the door of the control room," Morrow explained. "It's always locked for purposes of safety. Only the commanding officer has a key."

He found the key in the dead colonel's pocket and unlocked the heavy, air-tight door. Inside lay a small room, one wall of which bore a bank of shining levers, and a battery of dial-gauges and electro-telescope screens. Only from this room could the rocket-tubes that changed the mirror's position be operated. But there was no one in it.

CRANE came back into the office, Morrow relocking the door.

"Major Morrow, this puts you in command of the mirror now, doesn't it?" he snapped. "Will you have all the men called together below so that I can question them? And will you, Captain Britt, search their persons for

poison while I am investigating here?"

Britt nodded.

"I'll—I'll do it. But I still don't see how the killer got into this locked room. It's impossible!"

He and Lieutenant Laver went out. Major Morrow, the new commander, stared helplessly as Rab Crane started searching the office.

"There's some horrible plot behind all this!" the Major mumbled. "Some other planet is trying to sabotage the mirror—"

"Major, look at this!" Crane was pointing to faint little traces in the dust beside the desk where the mummified corpse was sitting. "Someone did come in here. But how—"

Without warning, the lights in the office went out, plunging them into Stygian darkness. Major Morrow uttered a startled exclamation.

"Stay where you are, Morrow," ordered Crane. His hand went swiftly to the beam-tube in his pocket.

Someone or something was in the room! Crane heard a faint, tiny sound of scurrying somewhere on the floor. A puzzling sound, as of an insect's dry feet. He listened, momentarily perplexed.

Crane's hesitation almost cost him his life. The next moment he felt something tiny and light clinging to his trouser leg. At the same moment he heard Major Morrow scream, hoarsely, horribly.

Crane kicked frantically to shake off the thing on his leg, and darted across the dark room to the light switch. His foot crushed something tiny that emitted a shrill, minute scream.

His hand found the switch and clicked it, without result. The lights had been put out of commission somehow. Crane heard a swift scurrying of other tiny feet, other little things climbing up his leg. He drew out his pencil-light and snapped on its thin ray, downward. He stood appalled for a moment at the horrible nature of the attack.

The two tiny things climbing up on his shoe, reaching for his trouser cuff, were *men!* Men no more than two or three inches high, yet perfectly human, bronze-skinned, stocky, tiny men like the minute homunculi of legend. They were reaching to stab long needles smeared with a shiny, sticky black into his leg. The dreaded "dry death!"

Crane struck them from him, and his foot crushed the tiny, murderous things into red pulp. He flashed his light frantically toward Morrow. In the thin ray, he saw Major Morrow still, his eyes glazed, his body already brown and withered.

Something sharp pierced Crane's ankle. Another of the tiny murderers had crept up behind him and had driven a poisoned needle into his flesh! In a few moments, the withering death would claim him also.

Rab Crane acted without a second's conscious thought. One hand swept the clinging little homunculus violently from his ankle, then snatched up his trouser leg. The puncture left by the poison needle was a tiny brown spot, and the brown was already starting to spread.

Swiftly, Crane levelled his beam-tube at his own ankle. Without hesitation he released the ray at half strength. It seared into his flesh with bone-melting agony, instantly burning out a chunk of living tissue. It was the only way to destroy the poison-infected area in his flesh.

RAB CRANE reeled with the terrific pain of his grim cautery. Yet he kept his feet, his gaze darting for the homunculus he had knocked away. It was running for the door, throwing itself down to creep out under the door. Crane grabbed the tiny thing and ruthlessly strangled it between thumb and forefinger. As he stood for a moment, panting, he heard cries of alarm and running feet pounding down the corridor.

Captain Britt, Lieutenant Laver and a half dozen other men burst into the office, flashing their lights. They recoiled in terror at the sight of Major Morrow's withered body.

Britt shouted an order to get the lights going. One of the men found a connection broken outside the door, and the lights in the office flashed on as he quickly repaired it.

"The killer got Morrow," Crane said

grimly. "And this is how he has succeeded in murdering all these men—using these tiny pygmies who can creep under doors and go anywhere unseen."

He showed them the crushed body of the tiny homunculus and the poisoned needle it had carried. Britt examined the tiny body carefully.

"It's a human being—kept down to one-thirtieth its normal size!" he told them. "It was done by inhibiting the post-pituitary gland with chemical injections before birth, I can see that much. And the process was probably aided by centrifugal force applied to the embryo—"

Rab Crane interrupted the medical man's scientific excitement.

"You're overlooking the main thing!" snapped the TSS agent. "These pygmies are bronzed, stocky little men. They're Mercurians—only grown to be one-thirtieth the size of an ordinary Mercurian."

His snapping gaze swept the astounded men.

"Do you realize what that means? It means that Mercury is behind this desperate plot against the mirror. There must be some Mercurian spy on board, disguised as an Earthman. And he brought these homunculi with him to use in his plot against the mirror, keeping them hidden in his belongings."

Britt examined the crushed bodies again. "You're right, they are miniature Mercurians!" he exclaimed. "You can tell the native of any planet, no matter what his disguise, by his internal organs, which differ according to his planet's greater or lesser gravitation. These things came from Mercury, all right. Everyone knows to what gruesome lengths the Mercurian biologists have pushed their researches. They've grown these tiny men and kept them secret, to be used by their secret service."

Lieutenant Laver's dark, sullen eyes stared at the tiny bodies.

"I don't see why Mercury would want to wreck the mirror," he objected.

"The Mercurians have hated Earth for years," Crane snapped. "Ever since we forbade further immigration of Mercurians to Earth. Crowded into the only habitable zone of their little world, the strip between the scorched sunward side and the cold opposite side, unable to relieve the pressure of population by sending more emigrants to Earth, they've hated us plenty. Now they're plotting against Earth—against the mirror."

He swung to the stupefied Britt.

"Captain, with Morrow dead, you're in command now, right? I want you to order a message radioed to Earth and request a battle-cruiser to come out here with relief officers and a strong force of guards."

Britt nodded bewilderedly and ordered Lieutenant Laver to give the radio operator the message.

Laver saluted and left. Rab Crane walked closer to the medical officer.

"You can find out who is the Mercurian in disguise, Captain," he said quietly. "You just said a Mercurian could be detected by his different internal organs. Well, I want you to put every man here under an X-ray fluoroscope and inspect them, at once. That will disclose the spy."

CAPTAIN BRITT'S eyes lit. "By heaven, it would! I'll go down to the hospital and get the X-ray outfit ready for an examination of each man. But first—the key—"

He bent and took the control room key from the dead Morrow's pocket.

"I'm going to search every compartment for more of those deadly little pygmies," Rab Crane told him as he left. "I'll be down shortly to see what you discover by examining the men."

Britt hurried down toward the hospital. Crane carefully wrapped up the poison needle and put it away inside his pocket. Then, beam-tube in hand, he began a search of the compartments on the third floor of the dome.

In none of the offices or rooms on that floor did he find further trace of the murderous homunculi. He descended to the middle floor and searched there also, without result. In the hospital on that floor he found Captain Britt, sweating from exertion, just finishing his examination of the last of the mirror's maintenance crew.

Britt turned from the crackling X-ray machine to Crane.

"I've examined all the men, and every one of them is an Earthman!"

Crane's lips tightened with disappointment.

"There must be a Mercurian on the mirror," he said savagely.

Britt shook his head. "I checked every man—but wait!" His blue eyes widened. "I didn't check Lieutenant Laver, or the radio operator. Laver hasn't come up from sending that message to Earth."

Crane stiffened. "They should have been through sending that message twenty minutes ago!" snapped the TSS man. "Wait here—I'm going down to the radio room."

Crane plunged down the stairs and along the corridors of the dome's lower floor, searching for the radio room, flinging open doors. As he opened one door, he stood petrified.

It was the radio room, crowded with the powerful televisor receiver and transmitter. But the great transmitting tubes were smashed, wrecked. The operator lay dead with a beam-hole seared in his back. And Lieutenant Laver was just staggering to his feet, dazedly holding his hand to a bleeding wound on the back of his head.

"What happened?" cried Crane.

"I—I don't entirely know," Laver mumbled. "I'd told the operator to get your message through to Earth, and he had just made connection when the door opened behind me. A beam flashed past me and killed the operator. Before I could turn, a blow on the head knocked me out. I didn't even get a glimpse of who did it."

"Then the operator didn't get any of the message through at all?" Crane exclaimed.

Laver shook his head.

"No, and whoever attacked us wrecked the radio. We can't get any call through, now."

"Come with me!" cried Crane. His face was a tight, tanned mask as he lunged out of the radio room and up the stairs, Laver following unsteadily. The TSS man burst into the hospital. Captain Britt was not there now. Crane's face went deadly pale.

"To the control room!" he cried. "We may be too late—"

He flew up the stairs, with Laver close on his heels, drawing his beam-tube as he ran. Crane plunged into the commander's office where Colonel Ames and Major Morrow still lay, two brown, withered mummies.

The heavy, air-tight door of the control room was just closing from the inside. Crane yelled and flung himself madly across the office with Laver. His shoulder knocked the closing door inward and he and the lieutenant hurtled into the control room.

FLASH! Laver groaned and plunged to the floor as a shining thread of deadly force tore through his body above the heart. Rab Crane spun wildly to train his own weapon on the man behind the door who had fired as they plunged in. But Crane was an instant late.

The other's beam-tube was already aimed at Crane's head. Rab saw only that tube, and then the blinding thread of force flashed out and the TSS man's brain seemed to explode in flaming agony.

Crane found himself slowly coming back to consciousness. He guessed it was but a few minutes later. But he found himself lying on the metal floor of the control room, his hands bound before him and his ankles tied. The side of his head ached and burned horribly. Laver still lay where he had fallen.

Captain Britt stood over Crane, looking down at him calmly. The air-tight, heavy door of the control room was closed.

"You!" muttered Rab Crane thickly to the chubby captain. "You—the Mercurian spy—I discovered it, but too late—"

Britt smiled. All the bewilderedness had left his chubby face and it was smooth, purposeful, deadly.

"Yes, I'm a Mercurian," he said evenly. "The disguise is good, isn't it? Our scientists grafted an Earthman's skin onto my face and hands, and altered the pigment of my eyes to this blue. How did you discover me, Crane?"

"You said you had X-rayed every man on the mirror without finding the

spy, except Laver and the operator," Crane told the killer. "The operator was dead and Laver was stunned by a blow he couldn't have faked. Then I realized that no one had X-rayed *you*."

"Clever, very clever," smiled the disguised Mercurian. "But, then, Crane of the TSS always had a reputation as the cleverest spy in the Solar System. It's too bad your career is going to end here, Crane. I meant to kill you with my beam a moment ago, but since it only grazed and stunned you, I decided I might as well let you see the finale of this little drama. To make you realize there is one spy even cleverer than the Earthman Crane.

"I am a Mercurian, yes," Britt went on hatefully, his voice harsh. "And I am fighting for Mercury, to give my world's crowded people the chance to emigrate to your green, beautiful Earth. You have room for millions of Mercurian immigrants—and they're going there, whether you Earthmen like it or not. We'll conquer your planet!

"I killed General Bray, and Colonel Ames, and Major Morrow, because with them dead, I succeeded to the command of the mirror. Which gave me the key to this control room. The end of my whole plot! I only killed the technician because he'd accidentally found me out. The other three had to die, to get me control of this room."

Britt smiled strangely down at the helpless Earthman.

"You shall see now what the end of my plot is, Crane. Watch!"

He walked to the bank of levers and laid a hand on one shining red handle.

"This control opens the air-locks of the whole dome, Crane. It empties the entire dome, except this air-sealed room, of air. It was built in so that if mutiny occurred the commanding officer could use it. It is why this control room was always kept locked."

"No!" cried Rab Crane hoarsely. "You can't do that—fifty men in this dome who will die in an instant—"

"I'd kill fifty million Earthmen to give my countrymen their chance!" flamed Britt. "Watch!"

He swung the handle down. There was a brief hissing sound throughout the dome. The voices dimly heard from below abruptly ceased. A dead silence prevailed.

"My God!" murmured Rab Crane. "Everybody here at the mirror, except us—killed instantly when that air rushed out."

"Exactly!" said Britt. The Mercurian's eyes were blazing high with triumph. "And that is not all, Crane!"

HE swung toward the screen of one of the electro-telescopes, touched buttons swiftly. The screen broke into light, transmitting the view from a lens in the concave face of the mirror. The huge, cloudy sphere of Earth, and the glaring, distant sun, were visible in it.

Britt magnified the view of one spot on the screen. A swarm of small black dots appeared in sight. They were space ships, a score of battle-cruisers approaching the mirror from sunward. Still far away but coming fast.

Britt's voice was a flare of triumph.

"Those are Mercurian war-cruisers! They have been hiding in space for days, waiting my call. I called them before I wrecked the radio. They are rushing headlong toward the mirror and will take possession of it without resistance when they get here."

He flung a panting, bitter taunt at Crane.

"Now do you realize how we Mercurians are going to force Earth to receive us?"

"God!" exclaimed Rab Crane, his blood freezing at the horror the other's words implied. "You mean you're going to use the mirror—"

"Exactly!" shouted Britt. "We're going to use this mirror as a weapon with which to force Earth to our will! The colossal shaft of radiant heat which it stabs towards Earth—suppose that terrific beam is directed on New York and your other cities, one by one? It will burn them to a cinder, will incinerate any city or spot on Earth it is focused at.

"Yes! This tremendous thing you built out here in space shall be the weapon by which we of Mercury force you to grant our demands. You'll let our immigrants come to Earth, as many as we choose—or we'll scourge you

with the beam until you do. And you'll never dare exclude us again, for we shall hold the mirror always."

The Mercurian's face was fevered with excitement. He wheeled, peered with quivering eagerness into the screen that showed the swift, relentless advance of the oncoming Mercurian cruisers.

Rab Crane's brain was freezing with the cold despair of ultimate failure. Failure that would give the Mercurians a weapon that they could use to enforce their demands upon Earth, irresistibly. The agonized TSS man strained wildly, vainly, to break his bonds. His beam-tube was in Britt's pocket—he had no possible weapon. But wait!

He did have a weapon—one he'd wrapped and put into his pocket and forgotten! If by some desperate chance he could get it out and use it—

Crane's bound hands pawed wildly in his jacket pocket. He was fumbling with horrible death, he knew. Britt still was at the screen, eagerly watching. Crane brought out the thing in his pocket and clumsily unwrapped it. He held it hidden behind his knees.

"Britt—y o u ' r e wrong!" he exclaimed. "You haven't succeeded. You're beaten now, if you only knew it."

The Mercurian spy whirled, his face harsh. "Bluffing is no good now, Crane. You're through—you know it."

Crane laughed gratingly.

"You think so. I'm only waiting. Waiting for the thing that'll destroy you when it happens."

Britt, his face deadly suspicious and menacing, strode over to Crane.

"If you think you can—"

Crane lunged his body forward. The thing in his bound hands flashed, buried itself deep in Britt's thigh.

It was one of the deadly, poisoned needles the pygmies had used. The one that Crane had wrapped and put into his pocket for further examination. The carrier of the dreaded "dry death."

BRITT staggered back, panic-stricken for a moment, then wildly plucked the poisoned needle from his thigh. He ripped his trouser leg. The poison, driven by Crane straight into an artery, was swiftly spreading through Britt's body. Already his legs were becoming brown, withering. A shriveling death was rising over his whole body almost faster than the eye could follow.

Britt, agony in his eyes, tried to draw his beam-tube to turn on Crane. But his slight hesitation had been fatal—the poison had already paralyzed and withered his arms, breast, and face. His face was turning to a wrinkled mummy mask as he reeled and fell.

His lips moved in a dry, husky whisper.

"You win, Crane—over me. But not over Mercury! Those ships are coming on and there'll be no resistance here—they'll still take the mirror and—"

His voice trailed off in a cracked whisper. His withered lips moved and were still. He was a dead, brown mummy.

Crane had cold perspiration on his face. The TSS man rolled across the floor toward the wall, hunched himself upright. He managed to tear his bonds through on a sharp switch-blade.

Then he sprang to the telescope screen. The Mercurian cruisers were larger on it, rushing headlong toward Earth and the mirror. Crane's brain rioted with the fatal knowledge that he, alone, could not hold off the space-suited throngs in those ships when they reached and invaded the mirror. Nor could he call Earth for help. Yet those ships must be stopped!

Crane's despairing mind suddenly thought of one possible expedient. He sprang toward the great bank of levers that controlled the mirror's rim rocket-tubes. If he only knew how to operate those controls, to move the mirror, he could still stop those ships. But he didn't know how—and all the men on the mirror who did know, were dead.

All of them? Crane wheeled, leaped to the side of Lieutenant Laver, still lying supine and unmoving on the floor.

He applied his ear to Laver's breast. A sigh of relief escaped him as he detected a faint pulsation there.

"Not dead yet!" cried Rab Crane hoarsely to himself. He lifted Laver, chafed his face, tried to revive him.

"Laver, wake up! Wake up!"

But Laver's eyes did not open. The man was slipping down into death, minute by minute.

Crane swore, pleaded, and then shook the dying man, cruelly and vigorously. The torture of the shaking brought results. The lieutenant's eyes opened.

"Laver!" Crane was almost sobbing. "You know how to operate those controls—you've got to tell me how to shift the mirror's position. Mercurian cruisers are coming, to seize the mirror and use it against Earth. The only chance to stop them is to shift the mirror so that the great beam of heat from it will blast those ships out of space. Tell me how, man!"

Laver dimly heard, and understood. The dying lieutenant made an agonized effort to speak. His voice was a whisper, "Co—coordinates of ships—"

"Just a moment—I'll get them!" Crane cried. He raced back to the screen of the telescope, his eyes frantically searching the fine network of lines across that gave a ship's position.

"Coordinates 283-B, 477-X, and 22-Q!" he shouted hoarsely.

LAVER'S eyes showed the struggle of his darkening mind against death, the effort at calculation.

"Rocket controls 5, 6 and 7 to Position C for fifteen minutes," he muttered finally. "Control 12 to Position A for same time."

The last words a mere gurgling murmur, Laver's head sank back, his eyes closing. But Crane was already wildly flinging the rocket controls over.

There was no sound. There was no air out there to carry sound from the rocket-tubes far out in the mirror's rim that had begun to blast and push the mirror's edge around in space.

It was turning majestically, slowly, in space. Rab Crane, hunched at the telescope screen, could see the giant beam of awful heat slowly wheeling, its end cutting across the icy south polar regions of Earth, then cutting far out into space as it wheeled like a colossal sword of fire. A gigantic, flaming finger, lifting from Earth to point back toward those onrushing cruisers.

Rab's eyes, his whole soul, hung upon the chronometers as the minutes ticked. Came the fifteenth minute—and he jammed shut the controls he had opened and adjusted those others that Laver had named. The mirror's slow shifting movement came to a halt.

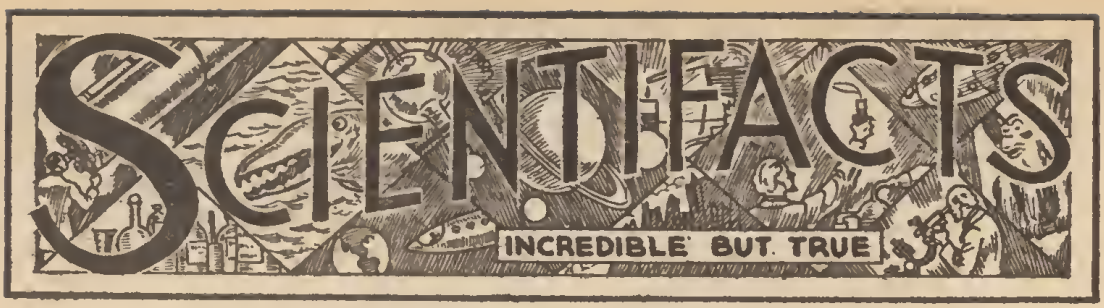
Crane's eyes leaped to the telescope screen at the same instant. He saw—annihilation! The giant beam of terrifically concentrated heat from the mirror was just catching the onrushing Mercurian ships. As it caught them, they puffed into fire and vanished.

Crane staggered back from the controls and stumbled over to Laver.

"Laver, you did it!" he cried. "The ships are destroyed! And Earth will be sending a whole squadron of our own cruisers out here at once, to investigate the turning of the mirror. The mirror's safe now."

Laver's eyes did not open. His lips murmured something that sounded like, "Glad—" Then they were still.

Crane slowly folded the dead officer's hands, and covered his body with his coat. Then the haggard TSS man went over to the telescope screen to watch for the cruisers from Earth.



A BRAND-NEW, FASCINATING FEATURE

By J. B. WALTER

THE VOICE A MOTHER WOULDN'T KNOW!

A SPARROW can be taught to sing like a canary! Ornithological psychologists believe that the tendency of birds toward vocalization is inherited, but the quality of the notes is determined largely by environment. Baltimore Orioles kept alone and out of

hearing of other birds developed a novel trill of their own, utterly different from that characteristic of their species. In another experiment, some young sparrows from the wilds were placed under the care of a canary, in a room with canaries. The sparrows learned more or less thoroughly the arias of the yellow songsters with whom they associated.

LIGHT READS TO THE BLIND!

SCIENCE has found a way to make light read to the blind. While books printed in Braille or one of the other "raised letter" systems have been of tremendous value in opening the world of literature to those afflicted by the loss of sight, this method has the obvious disadvantages of requiring long and difficult training, expense limiting its applicability and the bulk of the volumes produced.

A recent invention called the "Scanning Eye" meets these difficulties and overcomes them. It uses the ordinary printed book read by the sighted, translating the black letters into sound. A tiny beam of light dances over the printed page while a sonorous and pleasing voice calls out to the reader each letter, thus spelling out the passage.

This ingenious device is, of course, an adaptation of the photo-electric cell—one of the many electrical relay combinations that are changing so much of modern life.

Books printed in completely phonetic languages, such as German, could be read syllable by syllable, or word by word, by the "Scanning Eye." Unfortunately, this method is not practicable in English, where a single combination of letters may have three or more different sounds, as for example "ough," while others are altogether silent.

THE LAWS OF CHANCE ARE UNALTERABLE

THE game of roulette being a game of chance, it is governed by some of the unalterable rules of probability. Players are always attempting to "figure out a system" to beat the game by close observation of many coups; sometimes they are led into error by drawing erroneous conclusions from such observations. One notes after watching many coups that red will turn up as often as black; therefore, if red should turn up say six consecutive times, everyone will immediately play black on the next play, thinking they are playing an absolutely safe game since series of seven reds have occurred very rarely.

Actually, the chance of black turning

up on the next turn is an even one. The explanation of this error lies in the fact that while series of seven reds are very rare, series of six reds and a black are also very rare but do not attract the attention as much as the former series, and so are not as readily observed.

A HALF-MILE CUBE CAN HOLD EARTH'S POPULATIONS!

WHEN we hear people speak of the overcrowding of various cities and various countries, it should be interesting to point out a recent obser-

vation. If the 2,000,000,000 (estimated population) inhabitants of our planet were assumed all to measure 6 ft. tall, 1½ ft. wide, and 1 ft. through (larger than average measurements), they could all be placed in a cube measuring ½ mile in each direction; furthermore, this cube could be placed in a corner of our Grand Canyon and scarcely be conspicuous!

YOU CAN BE IDENTIFIED EASILY

WHEN thinking of positive identification one usually thinks of fingerprints; however, there are many other ways in which the individual can be identified definitely. Fingerprinting came into vogue because of its simplicity of technique and because of its early classification (Bertillon). Each person presents many other characteristics that are completely individual, but are not available for general use because of lack of knowledge of these identifying features and because of lack of a proper classification.

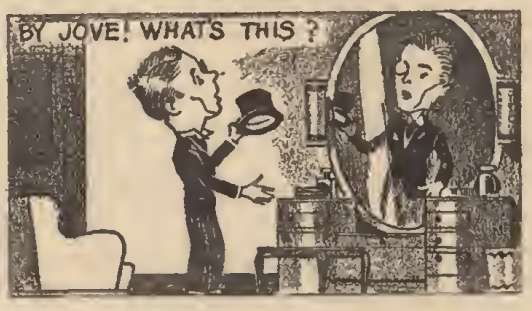
Recently, there has been introduced, a classification involving the photographs of the blood vessels of the retinas of the individual's eyes. Each photograph is characteristically different and, if classified properly, can be used to identify positively its individual owner. The advantages of this method lies in the fact that the blood vessels of the retina cannot be temporarily obliterated as can the whorls on the tips of the fingers (such obliteration has been done by our modern criminals by means of acid and surgery).

More recently it has been discovered that the record of the electrical waves produced in the skull by one's thought waves is distinctly varied and as such can be used to identify the individual. When more work has been done in this field and when a classification is eventually introduced, the method will be available for practical use.

THE "SWELLED-HEADED" PUBLIC

IT has been known for some time that the characteristics of races change under certain influences, but such change is gradual and takes place, at least, over generations.

However, recently a change has been noted that has occurred within a comparatively short period. This time the



hat-makers of Great Britain have observed that the sizes in demand by their customers have changed from 6½ and 6¾ to 7 and 7¼ and even 7½, indicating a definite increase in the size of the craniums of our British cousins. Anthropologists have been put to work on this problem and they feel that such change is not the result of any external influence, but rather the result of much greater thinking that the present-day British subject is forced to do.

More SCIENTIFACTS in the Next Issue

The DOUBLE MINDS

Penton and Blake, Interplanetary Explorers Exiled from Earth, Match Wits with the Dual-Brained Denizens of the Solar System's Largest Satellite!

By JOHN W. CAMPBELL, JR.

Author of "The Brain Stealers of Mars," "The Mightiest Machine," etc.

CHAPTER I

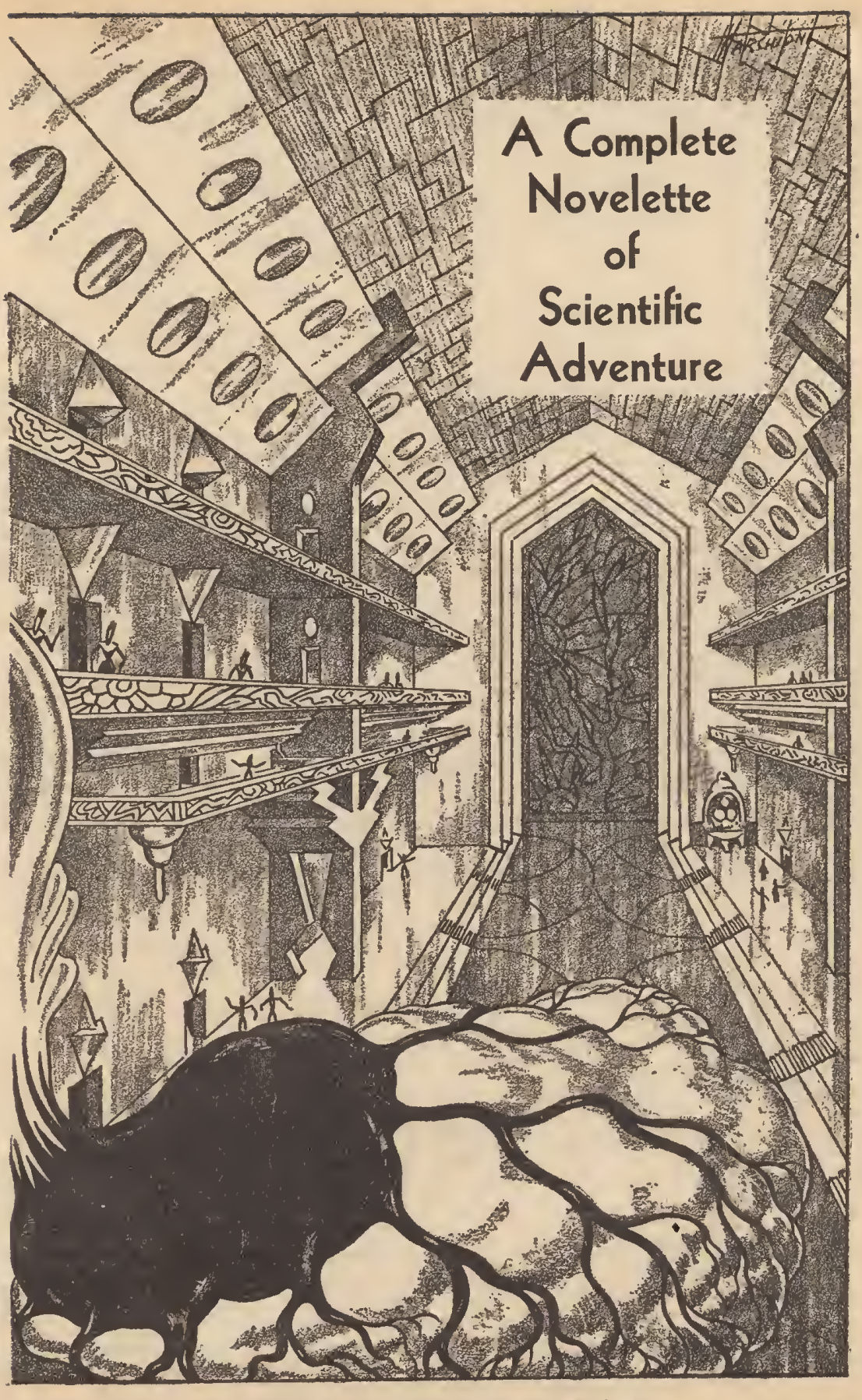
Prisoners on Ganymede

"P'HOLKUUN'S coming back," Ted Penton sighed. "Maybe he meant it."

Rod Blake stirred restlessly on the bunk.

"Will you make your news reports more explicit? You have your mug against the only clear spot on the damn glass door. Which one of those animated beanpoles is P'holkuun?"

"How can I describe him? He's a Ganymedian jailer, to you. They all look alike. Since we are the first human beings ever to see Ganymedians—or



The angry mass of protoplasm charged at them.

Ganymede itself—there aren't any words in the language to describe him. He is seven feet three inches tall, weighs about one hundred and fifty—or he would on Earth. He has that attractive green hair they all have, and he is wearing a Shaloor guard's uniform. He is shooing away our other guard."

"I guess he is as good an orator as you were," Blake grunted. "In five minutes you learned their language, found his political opinions, and had him sold on you to start a revolution. Man, you are political dynamite!"

"Political atomic power," Penton replied sourly. "I got us kicked out of Earth first for experimenting with the stuff. Kick number one; we get in the soup on Mars. Head for home, and all Earth turns out a great welcome for us—twenty-one gun salutes. Only they forgot to take out the sixteen-inch shells. They still don't want us. It was easier here. P'holkuun's a member of the rebel party, and the mind-reading stunt I learned from the Martians helped me make friends with him."

"Penton," suddenly whispered the thin, squeaky voice of the friendly jailer outside, "the Shaloor have investigated your space ship again. They are afraid."

"They are wise," replied Penton grimly. "If they disturb the atomic balances I have established in the engines, they'll blow this whole satellite clear out of Jupiter's system. They haven't a glimmering of an idea what forces I use."

"They don't believe you. They say you are a liar." The jailer, a Lanoor, sounded doubtful himself.

"They wanted me to take them in it out into space," went on Penton. "If they know more about my machine than I do, why don't they build one like it, and go out in their own machine? You don't even have the words atomic power and electricity in your language."

P'holkuun shook his head slowly.

"You do not understand. Ten years ago, the first Shaloor was made. He was a Lanoor, but he invented an operation, and tried it on a friend, then the friend did it to him. The brain is divided into two halves, only one of which ever works in thinking. If, however, a man is injured so the half he is using is destroyed, then the other half works. The Shaloor found out how to make both halves work at once. The brain is made up of thousands and thousands of individual cells, each one helping to think. When the Shaloor doubled the number of thinking cells that work, he became, not twice as brilliant, but over ten thousand times as keen-minded. With two factors, A and B, you can make only two combinations: AB and BA. With twice as many factors, you can make far more than twice as many combinations.

"In ten short years the Shaloor overthrew our rulers, developed a new civilization. They invented the *shleath*, and a thousand new vegetables and new animal foods. They will be able to learn your secret shortly. Some day our rebellion may succeed."

"The Shaloor are not omniscient. You are needlessly afraid of them." Penton snapped.

THE Lanoor's big, broad face split in a slow grin.

"You are in jail, Urd-mahn, thanks to the Shaloor."

"They trapped us by treachery—"

"The Shaloor are always treacherous. It is intelligent, they say."

"They will find it most unintelligent when my people come ten months from now with ships that can wipe out this city in a moment's time. We will so disturb the Shaloor that your waiting rebellion can succeed." Their jailer did not know that they had been exiled from Earth.

"Their gas—their gas always stops us. And the *shleath*. No man can face that—" The guard's ruddy face went pale at the thought, and Penton cursed silently that his very fear made his mind unreadable, even to the ancient method the Martians had learned and recorded ten thousand years ago in the ancient museums he had recently plundered. He could only catch vague, formless jellies wavering in a cloudiness of fear as the mental image.

"We have an older knowledge," Penton said shortly. "But do as you will.

We will be out in a day's time, if the Shaloor have not first released the frightful energies of our ship in their blunderings."

"I—I will talk with my comrades tonight," P'holkuun said, and moved down the corridor uneasily. Penton turned away from the little window in the frosted glass of the door. Though his Earth-bred strength was five times that of a Ganymedian, it was still far less than was needed to break down the thick, tough glass. Penton looked at it disgustedly.

"Damn," he complained mournfully.

"I take it he said, 'No'." Blake looked morosely at the door. "Nice birds they have here. You greet 'em friendly, they wave and grin, and beckon from airplanes while you come down out of space. You step out—and plunko—they trap you with glass bombs of sleep-gas. Ah, well—I can't sleep, I can't smoke, and I can't move. I—"

"Oh, shut up. Here, I'll make you sleep. Hypnotism."

"Can you? Say—that's right, you learned a lot of dope from those Martian records. Go ahead." Blake lay back thankfully. Ten seconds later he realized his error. He was helplessly hypnotized, and already he recognized the flood of strange thoughts pouring into his mind, other-worldly ideas. Penton was giving him knowledge of the Lanoorian language by the technique the Martians had developed ten thousand years ago: hypnotic teaching.

Blake was about to acquire a complete understanding of Lanoor, in about five minutes. Also, all the headaches that he would normally have had learning a language would be equally concentrated into one great-granddaddy of all headaches. He struggled to free his will—

* * *

The sun was shining in through the whole rear wall of the cell, which meant that it was day again, and he had slept for hours.

"No," said Penton's voice. But it was Lanoor he was speaking, and Blake moved his head gingerly and groaned audibly. Yes, the headache was there.

"No, I'll have to make the medicine myself. Tell them Blake is dying, that the air does not suit him. Hear him moan? Tell the Shaloor that I must have that stuff."

Blake saw a shadow, distorted by the uneven glass of the prison wall, move off. Penton turned toward him.

"Excellent, Rod, excellent. Nothing could have been better timed. I didn't know you were awake; and your help was really welcome."

"Help? Help, you cosmic blight! My head."

"I know. But we needed the stuff. Now he'll get it for us. You know their language now—we'll get the stuff I want."

"I've got a headache. Go away and shut up. Oh-h-h."

HE dozed, for when he opened his eyes again, his head pained less, and Penton was hard at work with some glass flasks, pungently odorous liquids, and various powders.

"Will you groan?" asked Penton pleasantly. "The guard is watching and listening."

Blake obliged. "Oh-h-h—what in double blazes—ah-h-h-h—are you stewing? It smells like fury!"

"I'm too busy trying to figure out something. Keep groaning, by the way. This is medicine for you. You're suffering because the atmosphere doesn't suit you. I can stand it, because I've had a dose of this atmospheric-cosmic-telluric acclimatizer."

"Groan? Great God, if it's anything you cooked up, I'm going to recover right here and now. You're no medicine man!"

"I am now. The stuff is now prepared. Hm-m-m—" he passed it under his nose. A mixture of pleasant, fruity smells and peculiarly rank, acrid odors pervaded the room. From a bottle he measured out a number of gritty crystals, then from a second bottle of green glass, a few more. He sniffed the results, tasted it.

"Try a bit," he grinned at last, and passed it over. "Guaranteed to make you lick tigers like lollypops."

Blake took it at arm's length, and sniffed. His eyes widened. He tasted it. His mouth widened in a grin.

"What stuff! Happy days will come again." A considerable portion of the potent brew went down. Blake relinquished it only under protest. "All right, but explain the ingredients."

Penton helped himself to a bit, and nodded.

"Citric acid—crystallized acid of lemon. Sucrose—commonly sold under the name sugar. Ethanol—otherwise ethyl alcohol. Carbonic acid—in no way related to the one with an 'l' in it—better liked as soda water. I thought the combine might strike you where you needed it, and anyway, I needed the rest of the brew."

Penton looked at, but did not handle, a large flask in which a watery liquid was stirring slowly about a white powder. Fully a gallon of the stuff was there already, and he cautiously added more from a large beaker, and more powder from a glass bottle.

"And that?" asked Blake.

"The universal solvent. Anyway, it should get us out of here, I believe. I—"

With a soft clank, the large glass block disintegrated, and its contents spewed out over the metal table, and down the glass wall of the cell. The table had been in a corner, and the adjacent walls and floor were liberally flooded with the deluge. An intense, suffocating odor sprang up at once. Blake pulled his feet off the floor hastily, and looked in dismay at Penton.

"I thought it would," Penton sighed. "It does that."

"What?"

"Be patient, and we'll see. You are supposed to be recovering from a fatal illness. I've got to tell the guard it's according to plan."

The guard was already unlocking the door, for he had seen the deluge. Penton waved his hands.

"Keep out—the vapors—Blake must breathe the vapors!"

The unsuspecting guard had the door somewhat open, but getting the said vapors himself, he promptly decided that Blake was welcome to them and departed.

"Look, Rod, they have just turned on the corridor lights!" explained Penton.

"Which reminds me to ask why you said even before we landed, that they didn't have electricity. Those may not be electric gas-glow tubes, but they're certainly one swell imitation."

PENTON laughed. "Wrong, two out of two. I said they didn't have electricity before we landed because the instruments on the ship indicated no sign of electric or electro-magnetic energy of any sort produced by man on the whole planet. As for the lamps, electric gas-glow tubes are a poor imitation of *them*. Those are biological lamps. They use some kind of a bacterial ferment, and they turn them on by letting air into them. Notice how dark it is already? Small world turning rapidly on its axis, with a thin atmosphere. It will be dark in another quarter hour. Better pack your belongings, because, m' lad, we are going out."

"How? Did P'holkuun finally decide to throw in with us?"

"No, not yet, anyway. I didn't think he would until we got out of here on our own legs. P'holkuun isn't going to ask help from somebody who is tied worse than he is. But—he'll help plenty once we get out of here."

"Yes—but how? Don't tell me we can go out through those solid walls!"

"Yes, through the walls. It's dark enough now, I suppose. Rod, will you wield that hefty hoof of yours against the wall in the neighborhood of that table, while I obscure the window in the door? I would have a chat with our jailer. Don't shake the building, though. You should go right through the wall. Easy."

Blake moved the table. Penton's argument with the jailer was about something impossible, and very loud, but Blake paid little attention because of the way the wall was acting. The clear, hard glass was crumbling under his foot into sand. It broke out in great chunks, and crumbled as though his foot were a pile-driver. In utter surprise he felt his boot sink into the stuff—and through it! In almost no time, Penton had so annoyed the jailer that the man walked down the corridor to avoid Penton's voice, and Penton walked with Blake through the wall

of the prison.

"Jupiter will rise in about two hours. When he comes up you won't need to be told, but you will need to be hidden," said Penton. "We appear to the local populace as inconspicuous as a pair of orang-outangs walking down Fifth Avenue arm in arm. And slightly less harmless. To them our build is the quintessence of horrible, brute strength.

"So when Jupiter's great bulk comes over the horizon, the reflected light is going to make us conspicuous, and not a sight to calm the nerves of nice, old Lanoorian ladies. Further, thanks to P'holkuun's thoughts, I know that our ship is somewhere on the far side of the city. So come on. First we have to get away from this neighborhood."

CHAPTER II

The Doughballs

TED Penton sailed over a twenty-foot wall surrounding the jail, and Blake found it easy to follow because of the satellite's low gravity.

"What—" he panted after a moment, "is the secret—of the wall—stop running—you fool—I'm winded."

"The air's too thin—to keep—it up," agreed Penton. In the darkness of a tiny alleyway they stopped. "The stuff I used was crotonaldehyde—an organic liquid — derivable from — alcohol. Works on the fact—that glass is not a true—solid."

Blake stared at him, panting.

"Yeah. Stone walls do—not a prison make—nor iron bars a cage. So what is it? That glass wall looked solid enough—it had me bluffed."

"Puffed, did you say? Glass is a liquid. Liquid got so cold it has turned stiff—past the gooey stage. Crotonaldehyde has the curious property of turning it solid. Long heating and cooling does it too, that's why kerosene lamp-chimneys used to get so fragile. Solid glass is extremely brittle and as strong as so much sand. When that stuff turned it solid it took all the strength out of it. We have to steal a car. Damn. No running or we will pant so loud they'll hear us a block away. They have cars. There ought to be one around here somewhere, and let us pray they haven't invented locks for 'em."

They covered six blocks before they saw a rounded, bulky lump in the road that was evidently an automobile.

"You drive, Rod," Penton said softly. "You are a better driver than I, and a better mechanic. Can you figure it out?"

"Lord help us, no! Is it electric? No. Steam? Compressed air? Gasoline? Diesel? How in blazes should I know? Where's the engine? Both ends look alike. I have never seen anybody drive one, and I don't even know which end is front. Is this one a steering lever, and—well, what's that other one back there? I—" the car jerked ahead suddenly.

"Oh," said Penton, "you do know how to start it."

Blake was too busy hanging on. He held the lever grimly in his hand, and pulled.

"What do I do to stop it?" He tried pushing the lever. The car showed capabilities of speed. He pressed in a different direction. The car stopped accelerating but by no means slowed down. The quite accidental fact that the road was straight helped. His foot felt feverishly for a brake pedal—and the car swerved aside into a pole.

"I think," said Penton, bending the door frame out of his way, "that they probably have a more comfortable, if no more effective means of stopping them. They can't have light poles everywhere. We had better hurry elsewhere. Someone will certainly investigate that crash. Anyway, the next car we try, you'll know they steer with their feet, and not try to jam on the brakes with the steering gear."

"The next one," said Blake clearly, "you will know they steer with their feet. And I'm going to take time out to find out how in blazes they work. I just took hold of that handle—and away she went. No starter—nothing!"

Six blocks away they found another car, not exactly like the first, but similar, seven seats instead of five. Blake

looked at Penton.

Penton hesitated, and looked about him. Surrounding warehouses loomed, dark masses against a star-studded sky. A tiny, bright moon rode high in the sky, and lower was another, even smaller. Giant worlds, as large as the planet they rode, but millions of miles distant in Jupiter's titanic gravity field. But their light was enough to show dim alleyways and fences made of wire and some woven, fibrous stuff.

"Right, Rod. Check the control system and let it go," Penton said softly.

FIVE seconds later Blake was in and after a few more moments of swift examination he started from the curb. The machine started with a swift, smooth rush, and the soft whirr of the blowers and pumps was the only sound from the engine. Rapidly Blake got the feel of the apparatus, the two steering pedals, the lever that controlled its speed by increase or relaxation of pressure on the grip. Relaxed, it became a brake of fair power; squeezed, the car shot forward with amazing acceleration.

"All right. I have it now. We need lights, and I didn't figure them out. They must have a dash control."

Penton worked swiftly over the dash with the aid of the hand flash he carried. Suddenly lights blazed on, and Blake sped on his way with more assurance.

Blake squeezed harder on the control, and the silent engine behind drove the car forward with a powerful, steady push. Rapidly, fully forty miles an hour, they cruised through the deserted district. The street that had led them straight toward their goal came to an end, and Blake hesitated at the curve, muttering at the inefficient brake system. Then he went right. Presently, on a more traveled street, he went left. More cars were about them.

As they headed toward the city, traffic became heavier, and Blake anxiously watched the system, trying to learn the rules of the road. They drove on the left, moving at a lively clip.

"They have traffic lights," said Penton quietly. "I just spotted the damn things. It's a block system, like New York's. See—way up ahead you can see that yellow light. That's stop. Red is go. We'll have to stop at this next block."

But traffic became heavier. Lights became confusing. And suddenly a bright flush crept over the sky, and almost immediately Jupiter loomed on the skyline. Five blocks later they were hopelessly caught in a traffic jam in the heart of the city. Drivers near them looked—and left. Beside them they had seen, driving a car, two monstrous, squat beings, with great ropes and bundles of inhuman muscles. To them they appeared like horrible animals incredibly become intelligent.

Blake opened his door.

"All off here. Transfer. Last stop. We can't drive through those stalled cars, and somehow, I don't think the drivers are coming back." Penton got out the other side, and silently they walked up the line of traffic. Behind them doors opened hastily, and feet scuttled away. Blake crept up beside the leading car, a gleaming, seven-passenger sedan, and rose abruptly at the driver's window. He looked quietly at the occupant. A grey-headed Lanoor stared back, and slowly his eyes closed. He shook his head and opened them very wide, then beat it.

Penton climbed in first, and Blake took the late occupant's seat.

"The lights have changed," Penton said. They made nearly fifteen blocks. Then they changed cars again, taking the first car in the line. Twelve blocks later they were again forced to walk up the line—and a dozen glass bubbles of sleep-gas crackled around them. Blake leapt upward, to the top of a car, and crashed through into the seat. He settled back in sleep before he could extricate himself.

Penton, who had started down the road in great leaps, looked back—and leaped faster. A two-foot thick, doughy mass was rolling of its own volition in his direction. He turned down a side street and increased his pace. He began to jump from side to side but it caught up with him.

IT was soft, and squashy, but rubbery. It simply clung about his feet,

and crept slowly up and over his legs, up his body, while he tore great holes in the doughiness that persistently grew together again. Desperately he drove his hand into his pocket while the Lanoor police ran toward him with their slow, exaggerated strides, gas bombs in hands. A glass bulb arched forward, but fell short of him.

Then his hand came free with the flashlight as the crawling, doughy stuff crept about his other arm. An instant later the thing was bouncing and bounding down the street madly, from side to side, throwing itself in all directions, smashing down the rapidly approaching Lanoor, and rebounding with evident terror. Somehow the flashlight had driven it away.

Penton loped leisurely into an alley, and after several blocks of leaping fences, circled back. A crowd of Lanoor guardsmen were carefully roping Blake. The Earthman lay inert in the roadway with his head thrown back, heavy snores gurgling forth. Penton walked as near as he felt was reasonably safe, and looked. An empty car stood nearby. He headed for it. It was a light roadster, and after some calculations he started it in the direction of Blake. The Lanoor guardsmen peppered it with glass bubbles; two doughy things tried to mesh its powerful wheels and were torn up, only to reform accidentally as one large one. The guardsmen scattered as the car rolled quietly forward and coasted to a stop.

Blake had already begun to stir, and Penton stopped. Evidently his previous exposure to the gas seemed to confer a semi-immunity. Methodically he released his friend. "I think," said Penton, thoughtfully, "that it is time to seek lodging for the day. This looks like a pleasantly dilapidated section."

CHAPTER III

The Shleath

PENTON looked down the shabby street. His view was restricted somewhat, because even though it was the widest of numerous sad cracks in the even sadder wreck that had once been a house and now sheltered them, it was narrow. A Lanoor was walking down the far side, stumbling through a series of dreary mud puddles in a peculiarly automatonlike way. Abruptly he halted stock still in the center of an unusually well developed puddle and shook his head slowly. It weaved about dangerously on the pipe-stem neck, and the shabbily dressed giant looked dazedly about him. After a while he started on vaguely, a gradual deepening of purpose putting increasing firmness in his gangling walk.

Penton sighed and turned away. He nodded to Blake and sat down.

"He's started. He did just what I ordered him to. Unless some Shaloor for some impossible reason picks that one man out of all the city to practice hypnotism on, those hypnotic orders I gave him are going to work, and he will bring P'holkuun here. It ought not to take more than an hour."

"But will he come? And will it do any good if he does? He didn't help us before," protested Blake.

"He will for two reasons. The chances are the Shaloor won't know that trick about crotonaldehyde—I used something else, a catalyst that intensified the action—and they are going to be mighty mystified as to how in Nine Planets and Great Spaces we took the starch out of that wall. They'll be even more worried about the way that doughball they sicced on me backfired when I used the flashlight. He'll come, and he will probably help, now that we have shown him we can do something the Shaloor can't. I think we have an hour to wait."

They actually had less than an hour. A small roadster came slowly up the street, and stopped four or five doors away. The tall Lanoor got out. With some trepidation, evidently, he came over and cautiously opened the door.

"Come in, P'holkuun. You are a welcome sight."

"You've caused a great deal of trouble," the Lanoor greeted them. "The Shaloor have posted many guards about the palace; it has made any hope of a revolution useless for some time.

They have taken the sleep-gas throwers away from the Lanoor guards, leaving them only swords. And the *shleath* are all locked up."

"Is a *shleath*," asked Penton thoughtfully, "a doughy thing without any legs, but possessed of a peculiarly unpleasant odor, and a miraculous slime?"

"No," the Lanoor sighed. "You have no idea of what *shleath* are. Those were *grethlanth* they turned on you last night. The *shleath* are fifty feet in diameter, but otherwise much like those things. The Shaloor are still very much puzzled by the way the *grethlanth* ran away from you. They are fearless, and never before have they run from a prisoner."

Penton smiled, grimly.

"That, my friend, was electricity. It was one of the forces the Shaloor have not guessed. Here, moisten your two fingers like this, and touch this little metal piece." Penton illustrated the action, and the Lanoor hesitatingly touched the terminals of the flash. Instantly he jumped three feet backward and fell to the floor.

SLOWLY he sat up, shaking his head, while Penton and Blake looked at each other curiously.

"That—that is horrible! Put it away!" gasped the Lanoor. "It made all my muscles writhe into knots. It made my heart contract as though a giant had squeezed it. It is horrible!"

"It is electricity," said Penton slowly, "and you seem to be very sensitive to it, much more so than we are. Now, what did you say a *shleath* was?"

"It is a great mass of protoplasm jelly which obeys readily the will of its controller," replied P'holkuun, rubbing his arm, and eyeing the flash uneasily. "It cannot be killed, because if part is poisoned that part is split off. If it is shot or cut, that does no harm. It is not affected by sleep-gas. It is immensely strong, and can assume any form. The Shaloor conquered the Lanoor rulers originally by sending *shleath* up a small drain pipe in the form of a thread of protoplasm, and having it assume the form of a roller in the barred and defended fortress where the Lanoor rulers were. The *shleath* digest anything the Shaloor want them to. They can dissolve even metal. Only glass is impervious to them. If there is even a ventilation hole, the *shleath* can seep through."

"How many are there?"

"Thousands. They use them as work animals when need be, because they can seep under a heavy stone, girder, or mass of metal, and gradually all come under it so that the mass is lifted. Or they can hang down as a sticky cable from a high place, wrap around the stone, and contract to lift it. If an ordinary *shleath* is not strong enough, four or a hundred devour each other and form one big one, and that does the work. In the last revolt, a thousand *shleath* made a ring around the whole Lanoor army, and contracted till they were just one large lump. The army was then part of the *shleath*."

Blake looked fixedly at Penton.

"I think," he said in English, "we'd best find the shortest route for another planet. I don't like the sound of these over-stuffed amoebae. But I'd love to stack them up against the Martian *thushol*.* Couldn't that pair have a time?"

"We'll have to get to the ship, P'holkuun. Then we can use its power to defeat your enemies."

The Lanoor shifted his feet, and looked across the room.

"The ship," he said finally, "has been moved to the palace. Twenty *shleath* did that last night. The Shaloor knew that you would make for the ship, so they put it where they could make sure you didn't get it. They are all in the palace, and they have the ship in the inner courtyard. That is the place we call the court of the *shleath*. I do not know how you will get your ship. Maybe you could make magic on a Shaloor as you did with the strange man you sent to me. The Shaloor are working to make defences, because they are afraid of you. They are even more afraid of the ship, so they have not touched it. If you can make a Shaloor do as the

*The *thushol* of Mars are strange parasitic organisms, peculiar for their ability to ape the physical appearance of anything known to nature. See "Brain-Stealers of Mars," December, 1936, THRILLING WONDER STORIES.—Ed.

Lanoor you sent to me did, perhaps you can get the *shleath* out of the way. But no Lanoor can move them; they cannot be imprisoned; they never die."

"Can you feed them until they are groggy?"

"No, they just break up into more *shleath*, so there are twice as many and twice as hungry."

PENTON looked slowly at Blake. "If you don't like the *shleath*, maybe we better decide to stay here for a while," he sighed at length. "You are sure there were not any left-over *thushol* on the ship? One of those Martian beasts might seriously distract the Shaloor just now."

"When Greek meets Greek," sighed Blake. "I'd love to see what would happen if an angry *shleath* met a Martian *thushol*. Would the *thushol* turn into an indigestible rock, or would he imitate a bigger *shleath* and eat the one that had attacked him? It is a beautiful, theosophical problem as to why the Lord ever let anything like that exist—"

"He didn't. The Shaloor invented the *shleath*, and from what the Martians told us, the *thushol* invented themselves. You know, Ted, back on Mars old Loshthu told us all about the *thushol*. Rearrange the letters in his name and they practically spell *thushol!* I'll bet he really was one of them, and was laughing up his sleeve at us all the while! But that's not the point. The idea is to get inside the ship without getting inside a *shleath*." He turned to the Ganymedian. "P'holkuun, can you start the rebellion?"

"Not until you can stop the *shleath*," answered the Lanoor firmly. "The rest of my people won't even talk rebellion until they are sure they won't be used for tid-bits. You have never had a fifty-foot glob of jelly scrunch down on your best friend, and watched the expression of horror fade from his face because his face was dissolving out from under the expression."

"P'holkuun, sit down a minute. I want to think," said Penton gustily, as he squatted cross-legged on the floor. "I have to find out what part of our science will beat your science. I know there is some item. Tell me things. Can you or your men get access to a metal-worker's shop? A place where there are all kinds of metals? And can you make there for me, many hundreds of small, metal machines? They will be simple, but I know a thing of science that will, I think, save you from further trouble with the *shleath*."

"We can get some metals. Not the yellow metal, or the heavy, kingly metals. Only Lanoor work in the metal shops, so we can make machines, if they are simple enough, and small enough to conceal."

"Good. Bring me, as soon as possible, a sample of all the different metals you can find. And—one of those doughy things—a *grethlanth*—that the police set on me the other night. Can you do it?"

"Yes," said P'holkuun, somewhat doubtfully. "But can you do anything?"

Penton smiled. "Friend, when I get into that sacred court of theirs, the Shaloor are going to come out of the palace faster than they have ever before moved. I shall want only about a dozen courageous Lanoor; all the rest of the rebels will stay well outside the palace and catch the Shaloor as they come out. They will come out very rapidly. And I would not advise any of your people to remain within six blocks of the palace."

"They couldn't anyway. The Shaloor live all about the palace. If you are sure—"

Blake lay down gently in the corner after P'holkuun went. He was tired. The atmosphere of the little planet was enervating. Furthermore, he only half

believed in Penton, and Penton became as communicative as the surrounding walls.

Blake slept. He slept quite peacefully until he was startled from his sleep by queer chirpings, cracklings, and loud bumpings. He sat up, only to be knocked flat by a massive, doughy affair that smacked into him, and swooshily dropped over his shoulder. Laboriously he struggled up again and looked at the dirty-grey mass that was cavorting crazily about the floor in the dim light of dusk.

EVIDENTLY P'holkuun had come and gone, and had supplied Blake with a *grethlanth*.

Penton was dashing madly about the floor picking up something, while the unspeakable dirty-whiteness was dashing about twice as madly—and abruptly dashed out of the window shrieking and gurgling unhappily.

"Well—maybe it's—all for the—best. That's hard work—here. Bending like that."

"What in the name of the Nine Wavering Worlds got into that thing?" asked Blake. "It acted as though the floor were red hot, and every time it hit it jumped higher."

"Copper," said Penton, "and magnesium. I wondered what pH value their metabolism used. Evidently it's greater than seven rather than less. But zinc does well enough, and they can get that. Copper though is expensive."

"It may make sense, but I don't see it. Where's P'holkuun?"

"Coming back now. His men were stationed outside to catch that thing when it got loose. I—here he is."

P'holkuun stuck his great head in. He looked about the very dimly lighted room.

"It went out very quickly. I thought it might have broken away and succeeded in attacking you as we had ordered it. The men have chased it two blocks now, and it is still going very rapidly. It refuses to obey at all."

"That's fine," Penton smiled. "Did it attack anyone?"

"The first one who tried to stop it. It simply rolled over him, and hastened away. What is this weapon?"

"Make me as many hundreds of these machines as you possibly can, P'holkuun, and I will take the palace with a dozen Lanoor."

Penton held out a web of wiring, a pancake of interwoven coppery and silvery wires nearly eighteen inches across. The intricate hookup of wires led into a small, solid, egg-shaped mass at the heart of the network, an ovoid of black, plastic material.

"You can make a great many, I think. And remember to make that whole device exactly as I have, changing no slightest detail, particularly as to the constitution of the central mass. Is it understood?"

"I will." P'holkuun looked somewhat wide-eyed at the savage little device that had sent the utterly fearless, nerveless defender of the Lanoorian peace scuttling out the window in such terror that it absolutely refused to obey orders.

CHAPTER IV

The White Flowers

P'HOLKUUN halted. Ahead, the narrow corridor cut through the solid rock turned, and beyond the turn it was a passageway lined with cut stone mortared in place.

"We enter the palace soon. No Lanoor is supposed to know of this corridor, as I say, and to prevent suspicion, the Shaloor station no Lanoor guards, and do not so much as guard it themselves. But they have men watching this night beyond that wall. They are suspicious—almost know that rebellion is starting. For four days now, you have been free, and they have not heard from you, have seen no sign of your existence. They believe you have obtained help, but they have received no word of a general uprising. And—" he looked at Penton from the corner of his eyes, rather doubtfully—"they know that no dozen men can take their palace, or menace them."

"Yes. They also know that no man can stand against a *shleath*, or any save a Shaloor order him. They know a

great many things. A most surprising number of those things are all wrong. Is there a door ahead?"

"Yes. Locked, with a heavy steel bolt. But—you said you could open that."

Penton smiled and nodded to Blake. Blake shifted two dozen of the flat, woven webs he carried to the dozen or so Lanoor who had accompanied them, each man rearranging the webs he already carried to take on the extra. Then the Earthman went forward.

The door was a secret panel on the other side, but from here it was obvious enough. A panel of thick, dense wood, a dark green, no doubt polished beautifully on the other side that opened into the main hall of the palace.

But from this side it was rough, and studded with locking mechanisms. Two heavy steel hinges supported it, and a series of three steel bars a half inch thick, operated by levers in the manner of a bank-vault lock, held it in place with all the rigidity of the surrounding wall. No careless hand could detect it from the far side.

Blake wrapped his fingers about the bars, braced his feet solidly, and pulled slowly, with greater and greater force. The mild steel gave under the strain, and slowly the bar backed out of the socket that held it.

Just before it was free Blake transferred his attention to the second, and then to the third. The Lanoorians listened to his panting breath, and watched the writhing muscles in silent awe. The Earthman was to them as unnatural as a superintelligent gorilla would be to us.

Blake backed off and rested, till his heavy panting in the thin air of the little planet quieted. Finally he stood up again, and nodded.

"Ready, I guess. Now, once more, what will we have to look out for, P'holkuun?"

"They have guns, mostly air-powered guns. They are almost noiseless, there is no smoke, the source of the shot cannot be detected. But they will not shoot through heavy cloth. The explosion guns do. First they will try the sleep-gas, until they see that we are immune, thanks to your discovery that a series of five doses made a man safe. Then—the White Flowers."

"Just what are the White Flowers?" asked Penton.

P'HOLKUUN shrugged his shoulders.

"They used it only once. They are afraid of it themselves, so they will be reluctant to try it. It is a mold that turns a healthy man into a mouldering, putrescent corpse in thirty seconds. The flesh falls from his bones in white lumps. And anything that touches him, or passes near, within thirty hours—follows him! So, if you see a man turn white, and hear his scream—there is no need to help such a one. Leave him quickly. And we must go quickly now. I know the way we are to go, all my men here do. You must stay with us; if you cannot, seek the innermost court."

"Good. Go ahead, Blake," said Penton. "I'll take the lower half." Together, the two Earthmen approached the door, and took hold. The steel bars popped from their sockets with a vast droning clatter, to vibrate like plucked reeds. Immediately the two men jumped through the opened door, the Lanoorians behind them. The great central hall was bright with the glow-lights, and a half-dozen Shaloor were streaking across the room toward them, drawing their gas-guns as they came.

A shrill cry was spreading through the palace, echoing from room to room. Feet began running in unseen passages, and somewhere women's shriller voices called out. Two Lanoor servants appeared momentarily, their eyes opening in surprise at the sight, then narrowing in sudden concentration as they vanished into familiar passages.

Blake's arm flung back. A rounded, nicely weighted stone flew from it with the super Lanoorian force a Terrestrial could give it. An attacking Shaloor doubled with a howl of pain and an instant later another fell with a little groan, the side of his head crushed in. Gas bombs fell about them as P'holkuun lead the way to a branching, wood-paneled corridor on the far side of the room.

"They will concentrate to defend the . .

inner court, since it is known that you have come," P'holkuun called back. "Hurry."

A pair of Lanoorians had spread out behind them, and their swords were flashing in efficient butchery. The Shaloor were vanishing now, into the various rabbit-warren passages.

P'holkuun led them at a sharp run down the passage, past a dozen intersecting warrens and into a smaller passage.

"P'holkuun!" a strange low voice warned softly. "Not that way, the gates will close. Turn aside. The third —right." Feet vanished. P'holkuun halted in indecision.

"I wonder if that was a Shaloor?" he asked unhappily.

"It was my cousin!" exclaimed one of the Lanoor. "He is a secretary—"

They took the third to the right.

"But I am lost now," P'holkuun muttered. "I do not know this route. Why didn't he join us to help—"

From a room on one side a Lanoor stepped out.

"You'd probably have shot me by mistake. Come." The man had two of the air-guns, and a blood-stained sword. "They are gathered to defend the great inner court. They have closed all entrances with steel grills, save the one that they want you to take, the *S'logth* gate. That is open—open for the *shleath*. What do you hope to do?"

"Lead us there," Penton smiled. "The sooner we reach the *shleath*, the better. What weapons have they?"

THE Lanoor shifted his slight weight to his right foot.

"Some strange things they found on the ship of the strangers. A little thing, like a pistol, or sleep-gas thrower. But it throws nothing, only light, and not bright light at that. A Shaloor died handling it, and they made two Lanoor find out the secret. Now they have twenty. There is another thing they will use if they must, but they fear it, for none of us have been able to make it work without terrific explosions. But the explosions destroy what they hit, so they may use it even so."

"Damn," said Penton softly. "They can stop the *shleath* with the ultra-violet pistols. And the atomic bullet guns. They might go so far as to attack the ship with them. Not even the ship could stand one of those atomic bullets. Thank God they're still more afraid of them than we are. All we can do is try. They won't know just what they are doing, and we may still get away with it.

"Lead the way, man."

Again they started, through more devious, involved passages than they had taken before. Through rooms where Lanoor servants looked, saw them, and looked blindly away, through rooms where startled Lanoor women rose angrily from sleep, and quieted with a grim smile as they saw who invaded their rooms. Down narrow corridors, through smoking kitchens. Down a long corridor—

"No, I tell you, no!" a Lanoor's voice shouted in exasperation. "They have not come this way. Why should they? They will go some other way if they have a particle of sense, and they will go entirely away if they know what I know." And then came the angry curses of a Shaloor. Abruptly they dived into a side lane, and P'holkuun grinned.

"The Shaloor cannot hear well. Nor see, for all of that. But the Lanoor hear us."

"P'holkuun! Who—ah, it is you," the Lanoor's voice continued. "They are waiting for you at the gate now with three *shleath* in hiding. Go back. You must try at some other time. The city has heard, and it is roaring with rebellion. The Shaloor are preparing to bring out the *shleath* as the crowd grows outside the palace. But go back. They are ready for you, and they have a new weapon."

P'holkuun looked at the new Lanoor recruit uneasily.

"Did you hear that, Earthman?" he asked Penton.

"Did you hear of the new weapon, Lanoor?" returned Penton. "Do you think they will ever know less than they know now? Be less ready to meet you with strange weapons? Do you think you can ever have a better chance than with the men who invented the

weapons you fear? And know more about them than all the Shaloor on the planet? If ever in time you have had a breath of hope, you have it now. Come on before that breath expires." Penton started on down the corridor. "And you don't have to worry about the *shleath*. They will be more worry to the Shaloor than to you."

"Then stop. That is the door that leads to the hall of the *S'logth* gate. If you open the door, the *shleath* will be in here at once."

"What is out there, then?" Blake demanded.

"There are, apparently, three *shleath*, and the Lord of Worlds only knows how many Shaloor, waiting to shoot, gas, bomb, and kill us in every other conceivable way."

"Where are the Shaloor?"

"They will be in the high gallery. The *S'logth* gate goes up three stories, but we are on the first, since only thus can one enter the inner courtyard. They will be on the second and third galleries, and they will be watching for us. We cannot enter here until, somehow, the Shaloor are driven out."

"How do we get to the third floor gallery, then?"

P'HOLKUUN looked to the Lanoor secretary who had joined them, Tathuol. The man shook his head.

"I can try. But it will do little good, since there we will be unable to reach and enter the gate we should pass through, because we can't reach the floor. And the Shaloor may have the steel grills in the way."

"If I once get my hands on one of the weapons they stole from our ship," said Blake grimly, "all the Shaloor on the planet, and all the *shleath*, steel grills, stone walls and assorted animals and plants won't stop me. Just get me near one of those Shaloor."

The way was a winding, climbing corridor, and it led them through back rooms and twisting flights of stairs. It led them up trap-doors in closets, and in impossible ways. Finally Tathuol halted.

"That is the door. There will be half a hundred Shaloor waiting for us out there."

"Don't disappoint them, then. Come on!" Penton yanked open the door, and jumped out, low. Fully the promised fifty Shaloor turned toward him, raising their guns. Instantly the walls were peppered with shot, and, with a queer hissing, droning hum, a beam of pale, deepest violet stabbed through the air. Not toward Penton, but across the great hallway to a hanging balcony on the far side! Someone howled in agony there, and together, Blake and Penton charged down the hundred foot length of the balcony.

It was only some twenty feet wide, and between them, with P'holkuun in effective action, the balcony was cleared in less than fifteen seconds. Cleared, for the Shaloor jerked and moved on the courtyard floor, eighty feet below.

Penton stared about him, Across the courtyard, four similar balconies hung at the same level, and four more below. On his right, on this same side, another balcony clung to the dark stone wall, and two more on the left. Four below him. The great ceiling arched low above his head, studded with hundreds of glowing lights. And in the great hall below, three monstrous things pulsed and staggered, three things like green, gold and purple amoebae fifty feet in diameter.

They were surging and wavering madly, and then suddenly they stopped and ran together. Horribly they merged into a single, frightful mass of pulsing, nauseous flesh. An oozing, angry mass of protoplasm, it charged for the wall, and miraculously sent a vast finger of jelly-stuff sprouting swiftly upward, past the balcony, toward them!

Abruptly, Penton heard the clanking sounds of dropped metal, soft moans of terror, and scampering feet. The Lanoor were leaving. Only P'holkuun and a half dozen others stood, white-faced, beside the Earthmen. "The *shleath*—coming—" said P'holkuun stiffly.

Penton crouched. The wall of the balcony, some four feet high, was carved with an intricate design of flowers and trees, and intricate spaces cut through the stone. There was an angry silence in the court. Only the

soft, horrible *shluffing*, slobbering sounds of that vast monstrosity climbing the wall. It had dwindled to a twenty foot thing of green jelly with a purple, angry bruiselike knot in its middle, with golden thread shot through it. But up the stone wall, to within a few feet of the balcony, the questing mustard-green, pseudopodal arm clung tenaciously to the minute grips it found. Penton crouched and waited, peering through the tiny holes.

"Pick up three of those webs, Blake," said Penton, softly. "And wait until that thing reaches up here."

SOMEHOW P'holkuun made himself move. He handed Penton a half dozen of the flimsy, interwoven webs of silver and copper wires. They looked like metal spider webs with black, rubbery spiders clumped at their centers.

Then the vast arm reached up to the balcony. Thick fingers of slime reached through the openings of the balcony wall, and waved with a horrible suggestion of individual, hateful life. The great, green wave curled smoothly over the wall, and sprouted thick tentacles that stabbed out toward the Earthman as he rose. In his hand the flash, with its projecting, copper terminals, blackened by the burning arc that had fused the lock, gleamed dimly.

He thrust his hand toward one of those jelly-ropes, and braced as the thing clamped viscously about him. Then he pressed the button that shot fifty volts of powerful current into the vast mass of protoplasm.

Somehow it screamed. The city quieted to that ineffable shriek. An unspeakable hatred was in it, and an indescribable terror. The rope turned livid yellow, and contracted so swiftly that the mass on the floor jerked halfway up the wall to meet it, and fell with a liquid, splashing plop. The mass heaved; it split into three separate pieces, then half a dozen, and they all howled.

Accurately, Penton tossed one of the metal webs so that it fell onto the center of one of the pulsing, writhing things on the floor. The *shleath* shrieked with the same unspeakable, evil hatred, and the same awful terror, but somehow it whined; it begged. It scuttled into a corner and cowered there.

And another one of the blind, terror-stricken things touched the spider of black, and gold, and silver. It leaped five feet into the air, and splintered on the floor. The great *shleath* split into a hundred tiny things that rolled and scuttled and bounded with little evil squeaks of terror as they accidentally touched the black spider.

The larger ones were coming under control. Reluctantly, angrily they moved about, incorporating the smaller ones into their vast bulks. They joined again to two vast masses that charged for the wall. Penton dropped another of the webs. Then, in swift succession, two more.

There was point to their anger now. They howled, but they howled with directed anger. From the horribly stinging balcony they turned to the masters that drove them on. A wave of slime engulfed the lower balcony directly below the Earthmen. Penton watched the struggling Shaloor turn horribly red as their mouths gaped open in the thick, transparent jelly. They turned red, and stained the green about them, and struggled jerkily, then feebly; and through the clouding redness that grew in the green jelly, vague, shadowy things that might have been white bone here, or bared vital organs there, began to show.

Penton turned away. The *shleath* was stretching out an arm toward the nearby balcony below, where milling Shaloor shot hissing pistols at it, and finally—something white blossomed in the greenness. The *shleath* seemed to suck in the whiteness and engulf it, but the white splotch grew, and spread with an awesome rapidity. The *shleath* writhed and spewed out the mass of white and green life stuff. Then the rope looped out again.

Softly violet, softly humming, the beam of one of the stolen pistols stabbed from the balcony. It struck the courtyard below, and wandered wildly, erratically about while the wave of green washed over the balcony. Again a white splotch blossomed, and

again. Twice the thing spit them forth with masses of its own stuff. Then the white blossomed on an infected Shaloor, and he fell screaming, tearing at his leg, as the stuff whirled through his veins. He writhed over the edge of the balcony, and lay beside the white tufts of ejected tissue from the *shleath* white as they, and growing soft and downy.

CHAPTER V

Bifocal Vision

ABRUPTLY the wildly wavering beam of the UV pistol snapped out. Tensely Penton watched as a pseudopod of the *shleath* lapped up a Shaloor. The one with the stolen weapon seemed to be concentrating, his brows wrinkled in fear-filled thought. With both hands, he held the pistol, and abruptly swept it around the *shleath*. It exploded into flare, and the *shleath* howled in agony again. Dense, nauseous smoke welled up from the flaring spot where the ultra-violet beam tore into it, bubbling horribly. The thing dropped from the balcony, splitting into a hundred parts as it fell.

Blake spoke softly.

"I've been usefully engaged. There are about fifty less Shaloor. They have been too busy to watch, and these guns work. There was only one UV pistol here, and that went over the edge with one of the Shaloor."

"P'holkuun, you said they couldn't see?" Penton asked softly. "What do you mean?"

"They can see. But they don't point right. They never drive, they never fly planes. They seldom write, or do experiments themselves. We do not understand fully. But there is something the matter with their eyes."

"Thank God for that," said Penton. "I think I know what it is. They've joined the two halves of the brain, and are far more brilliant than any creature has a right to be, but they pay for it. Only one half the brain does all the thinking. That's true enough. But both halves see, and both halves hear. Both halves help with moving the body about. Somehow, when they cross those two halves of the brain for greater keeness, they see double. They probably hear double too. They can't coordinate arm and eye well. They forced themselves to learn to move a bit, but they can't make themselves see straight.

"They are more intelligent, no doubt of that, for they have more UV guns than we made. They figured out that unknown system to that extent in one week's time. But they not only see double, but by some psychological trick, they see the wrong image best! They missed us when we appeared suddenly. That Shaloor that tried to kill the *shleath* with the UV gun shot up all the court but for the spot where the creature was. They can't move quickly, and they can't see straight. That gives us a far better chance, and changes my plans a bit. P'holkuun, can we get somewhere where we can throw the webs into the inner court? Let's finish the job."

Tathuol nodded.

"Yes. Come." He led them back, through twisting corridors, through rooms where terrified Lanoor whispered and asked questions. They had heard the screams of the maddened *shleath*. The news was spreading. Then they reached a barred gate, a grillwork of locked bars that closed off the corridor. Beyond it they looked into a great courtyard a quarter of a mile across. The vast ramifications of the palace surrounded it on every side. And in it half a hundred of the giant *shleath* wavered and stirred uneasily, crowding down at the gate beyond which they had heard the strange shrieks of their fellows.

Somehow those giant masses of jelly had a brain and understanding. And they were restless. The glow-lamps cast only dim sparkles of light on hulking masses of greenish jelly. And, out in the middle of the court, silver metal on the *Ion*, the ship that had brought Penton and Blake to this world, glistened faintly.

"Oh, for the wings of an angel! How in blazes are we going to get there?" Blake mourned.

PENTON began tossing the black and silver and gold of the spiders methodically through the bars. One—five—a dozen. Some fell short, some long of their mark. It was hard to aim at an angle on a light world of unfamiliar gravity. Then two in quick succession landed.

"Back—back to the entranceway where we can get into the courtyard," Penton yelled over the shrieks of the two monsters. A giant began stamping. The whole palace shook to the thud of his tread. Then it stopped. Human feet began running somewhere, and the shouts of the Shaloor pierced the roaring that came from the inner court. Penton hesitated. Then he gathered all the spider webs, and threw them into the yard below, spinning them all over the court. Dozens of them skimmed into the night to fall with soft, clinking rustles. Three times he scored hits. But now restless, wandering *shleath* were accidentally touching the stinging electric traps.

The radiating copper and zinc wires reaching out from the rubber egg at the center were charged by the little battery protected in the black, elastic shell. The first electric batteries on this world! And these *shleath*, the mighty, indestructible *shleath* howled in malignant terror. They had no true skin, they were vast masses of naked, unprotected protoplasm. Each touch of those charged wires sent a minute electric current charging through their vast masses—torturing, unbearable current.

It was happening there in the courtyard as Penton had known it would. The vast yard was boiling with the protoplasmic Titans, their weird, gold-shot bulks glistening in the dim lights, their weird, anguished cries shrilling in the night. Outside the palace a vast echo was rolling back, the vast angry roar of the roused Lanoor rebels. Here below, as the elephantine bulks of the restlessly moving *shleath* touched one of the electrically charged webs, the shocking current made it writhe and heave. Frantically they sought escape, escape that was barred by the glass walls, by the special doors.

Shaloor were appearing at the lower gates, ordering them, directing them. Abruptly a mighty, shining bulk rolled down to the pompous midget, and whipped him into extinction with its glistening pseudopod. And the Thing howled. A shock-disc touched it. Every move of its sprawled bulk touched one of the scattered shock-discs. From other gratings about the great court P'holkuun's reinforcements were tossing in the webs now; the court was paved with them.

The *shleath* found only one escape. They were dividing now, splitting and dwindling, splitting till their jellied bulks covered more, but smaller areas. Smaller, smaller they became as more and more of the webs fell. They could slip between them now, find some surcease from the unknown horror of electric currents whose tiniest trickle made them writhe in agony.

Penton watched in silence. The fifty-and seventy-five-foot Titans had dwindled, screaming. None was larger than a two-foot globe of jelly!

"Put on those boots," said Penton softly, "and come on." From his waist, he himself unstrapped the network of charged wires, and wrapped them about his legs. From his belt two sets of wires dangled, connecting the leggings to five tiny cells. "Now, P'holkuun, where is the man with the rope? We can go down there now, if we can open this grill. No *shleath* will dare to touch us now. This grill is bolted in two places, and I think the atomic flash has still power enough to burn two."

THE atomic flashlight was changed now; two heavy copper leads had been soldered to its terminals. As they touched the steel bolts, the hissing green flame of the copper arc shrilled into the metal, twice. The flash tube, its storage device of twisted atoms intended only for the light task of providing illumination, hummed and grew warm. The bolt sputtered suddenly and fell molten. The lurid green flare ate at another bar.

It glowed red, then white—and parted. Another—and Penton dropped the flash tube with a curse. It glowed for a moment, and died, its last dregs of energy exhausted. Together the Earth-

men heaved at the weakened grill. The grating moved a fraction of an inch protestingly, and held. Again and again the two men heaved; finally all the Lanoor who could reach it added their strength.

Then, from a distant grating, a violet beam of death reached out, and crackled the stone twenty feet from them.

Penton ran. "Damn," he groaned. "They've spotted that grating, and they won't let us near it now. We've got to try some other way. I wonder—"

He started down the corridor, turned back to the next grating, and tried it. It was locked as solidly.

"Right, my friend," Penton nodded slowly. "They will be, before the sun rises. But—be spry." Penton took the Lanoor's hand in a firm grasp for a moment, then followed Tathuol. Through the rabbit-warren palace they dodged. Once they met a searching party of half a dozen Shaloor armed with the little yellow tubes that carried the deadly White Flower—had kept out of sight. But Tathuol knew the mazelike routes of the building far better than did those lords by proxy, for their strange, crossed vision made walking difficult, and they hated it.

"Beyond that turn," the Lanoor said at last, "is the grating we saw the Sha-

"Tathuol, can you lead me to a grating where there are some Shaloor posted, at least one of whom has one of our weapons?"

The Lanoor thought a moment. "I can lead you to the one from which they fired just a while ago."

"Good. P'holkuun, if you have a brave man, tell him to stay at that grate we left, and test it every few minutes until we give him the signal to stop. He has to keep out of the way of the beam, but he has to keep the man who is running it interested. Anybody want the job?"

P'holkuun laughed mirthlessly.

"I doubt it. Go ahead, I will take care of it. If my luck is bad, remember your promise to free my people."

loor fire from. I cannot guarantee that he is still there."

"Let us just hope so, then. We—ah, he is." A brief, soft glare of violet shot out from the corridor's end. Noiselessly Penton rounded the corner, Blake close behind him. Four Shaloor stood watching, looking out across the courtyard to a distant gateway where metal bars shone dully red. Cracked, blistered stone told of the violence of the pistol they used.

"He is trying to get us to melt that gate away," said one of the Shaloor uneasily.

"Much good may it do him. I'll get him the next time he shows, because I haven't changed the direction since the last shot. I—"

Penton's powerful arms wrapped two of the bean-stalk giants while Blake caught the others. Instantly six of the Lanoor who had followed them descended and in the space of seconds, the Shaloor glared in anger from their bonds.

PENTON examined the gun he held.

"It's one of ours. Needs a new charge, too; not more than ten second's life left. This one is set for steel, too, and we haven't any. Well—"

With a knife for a screw-driver, and two bits of metal in pinching fingers for a wrench, Penton opened the butt of the weapon, and pulled out the tiny reel that carried the iron-wire fuel. Then he adjusted four tiny screws and tore a strip of the copper wire from his protective leggings. With Blake's aid he stretched it cautiously. It was good copper, and it fined down several gauges before it broke. Then he inserted that into the reel, and clamped the gun together.

"Now, if my memory is good, and I have the right constants for the slow release of the copper's energy, we'll get out in fine style. And if it isn't—we'll go out in fine style," he added grimly.

Penton aimed the gun at the grate, and pulled the trigger. Instantly the beam shot forth, a blazing inferno of light that volatilized the grating almost instantly, speared through to the courtyard below, and sent up bubbling smoke. The squealing anger of the *shleath* changed to a vast shrieking. Penton hurled the weapon to the floor. Slowly a glow built up in it, a glow that spread from the tip of the barrel to the breech, and the smoke of the wiring rose from it.

Blake and Penton were two hundred feet down the corridor when the incredible sharpness of the explosion wave hurled them along for twenty feet, like peas from a pea-shooter. The clatter of falling masonry grumbled behind them, and even the steady wail of the *shleath* quieted momentarily.

Penton picked himself up gingerly.

"Not bad," he said judicially, "not perfect, but not bad. It might have been, to put it mildly, somewhat worse. We're lucky the town's still here."

Over tumbled blocks of stone that made a perfect ladder, the two men scrambled down to the courtyard. Undamaged, the *Ion* lay some fifty feet from the end of the slide that had crumbled half one wall of the yard.

It was not a path of roses. The Shaloor were on the job, and only their incredibly confused eyesight made it possible. Consistently, half the beams and bullets tore into the enraged *shleath* behind them, and half spattered before them. None came near them.

Ten feet from the entrance Penton gasped, and fell. His unprotected hand was grabbed instantly by a *shleath*, before Blake could lift him to his feet again. The touch of Blake's boot drove it away as Penton spoke: "They have the range. Get in that ship, you fool—they got my leg with a bullet."

"Uh-huh," said Blake. "You talk funny. Hold on. Even on a light world you are heavy—"

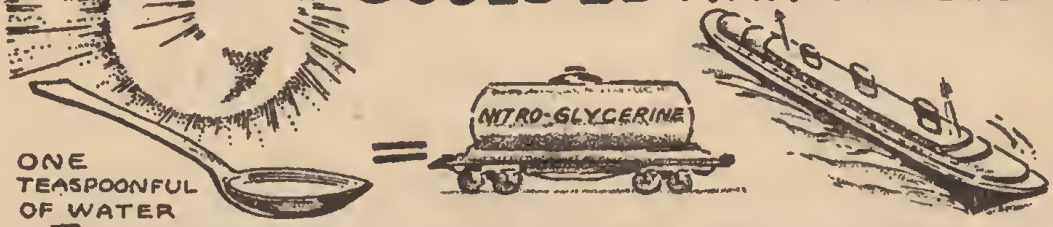
Another Penton and Blake Novelette Next Issue!

FROM a height of some five hundred feet, Blake looked down. Then he turned on the spotlight, and looked at the courtyard below. He adjusted some controls, and when the spotlight exactly covered that yard, he pulled a small tumbler. The light turned violet, and the heaving, greenish floor turned brown and became quiescent. The light went out. Blake pulled the microphone near him, and spoke softly, words that roared from the loudspeaker in the outer skin of the ship.

"P'holkuun, if you will come up alone in a plane tomorrow at dawn, we'll meet you. I could take that palace apart, but most of the inhabitants seem to be your folk. In the meantime, I have to pull a bullet out of Penton's leg. Tomorrow at dawn, in a plane from the local port."

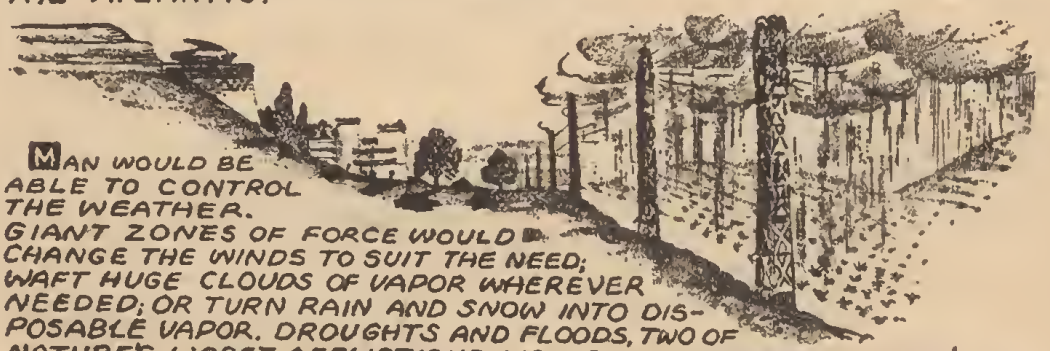
BY JACK BINDER

IF ATOMIC POWER COULD BE HARNESSED!



ONE TEASPOONFUL OF WATER

ATOMIC POWER – THE TREMENDOUS FORCE LOCKED WITHIN THE ATOM, IS THOUSANDS OF TIMES MORE POWERFUL THAN NITRO-GLYCERINE. THE TOTAL ENERGY IN A TEASPOONFUL OF WATER WOULD EASILY POWER THE QUEEN MARY ACROSS THE ATLANTIC!



MAN WOULD BE ABLE TO CONTROL THE WEATHER. GIANT ZONES OF FORCE WOULD CHANGE THE WINDS TO SUIT THE NEED; WAFT HUGE CLOUDS OF VAPOR WHEREVER NEEDED; OR TURN RAIN AND SNOW INTO DISPOSABLE VAPOR. DROUGHTS AND FLOODS, TWO OF NATURE'S WORST AFFLICTIONS, WOULD NO LONGER BE KNOWN!

THIS ENDLESS LEGACY OF POWER WOULD REJUVENATE INDUSTRY A HUNDRED-FOLD – WOULD GIVE MANKIND EVERYTHING IT NEEDED WITH INFINITELY LESS TROUBLE AND EXPENSE THAN THROUGH THE USE OF COAL, OIL, AND ELECTRICITY. CIVILIZATION WOULD BECOME ALMOST COMPLETELY MECHANIZED. THERE WOULD BE MUCH LEISURE. IT WOULD BE THE GOLDEN AGE!

WAR WOULD BE OUTLAWED, BECAUSE OF THE TERRIFIC DESTRUCTIVENESS OF THE WEAPONS POSSIBLE WITH ATOMIC ENERGY. THERE WOULD UNDOUBTEDLY BE A LAST WAR, FRIGHTFUL AND CATASTROPHIC, AFTER WHICH MEN WOULD REALIZE THERE MUST NEVER BE ANOTHER!

Next Issue: IF THE EARTH STOPPED ROTATING!

ROUND ABOUT RIGEL

Raiders Meet Grim Starlight Justice in the Interstellar Void

A hideous, bulbous face passed a circular spaceport

By J. HARVEY HAGGARD

Author of "Relativity to the Rescue," "Human Machines," etc.

"BLAZING Novas!" exclaimed Lieutenant Hermer, looking down cautiously into the funnel-shaped declivity. "They're hatching. It must be an incubator here on Vaporia."

High overhead shone the pinkish-hued Rigel, tiny as a child's marble, yet so intensely luminous as to give scarcely less light than the solar sun on Earth, even through the diffusing atmosphere of Vaporia, a cold husk of a former star, which just now was acting as Lieutenant Hermer's prison.

He had been marooned here a few hours before by two of his erstwhile prisoners, the Mason brothers, whose elusive trail of savagery and crime had led across space from planet to planet. Now he was startled at what was taking place in the funnel-shaped cleft.

Lemon-yellow bodies writhed from torn yard-long cocoons; tiny yellow arms, legs and antennae developed as the sun dried agglutinous coverings. Since hatching the figures had expanded incredibly.

"What a childhood!" murmured Lieutenant Hermer, noting the shafts of sea-weed consistency that composed the outer walls of the incubator, while it was obviously covered by a transparent conical roof that sheltered the fledgling bodies. "What kind of creatures are there on Vaporia! Ouch!"

He had leaned over a huge empty shell, and his hand was cut on a horny projection. The slope below was covered with empty shells, some reminding him of gigantic icicles, of crooked tubes of a pipe organ, but all of them recalling to mind that an aqueous world had come and gone on cooling Vaporia. Back on Earth, people would have scoffed at the lavender of Vaporia's horizon, the pink flower blossom zenith.

A sulphurous wind soughed mys-

teriously through crumbling shells, carrying crackles and rustlings that hinted of unseen things moving, and a difference in air pressure benumbed the flesh. An unusual scene; a terrible one when the outer flesh was crying for nourishment.

Two possibilities. One to die here and end the career of an officer of the Space Guard. Another to learn to eke sustenance from this bizarre environment? And a third—

Eon Hermer would give a good slice of his life to get his hands around the necks of the Mason brothers. A short while before, he had been their captor, with the ovoid space patrol vessel as their prison, but the two criminals had loosed a stupefying gas that had overcome the Space Guard officer.

Yet before they marooned him, he had secretly managed to destroy the element tanks wherein lay the precious source for water. Before they left Vaporia for a flight across space, they would have to make another landing to restore the missing elements.

LIEUTENANT HERMER had a slim chance of stumbling on them as they did so. He had his bare fists, a compact, space-hardened body, and a small dissembler revolver that had been concealed in his clothing. Three precious charges reposed in the diminutive chambers of the gun, each of which would sweep all matter aside in a foot-wide swath before the projector.

The gun was blue metal glyzite, blue like the glittering insignia over his left breast. The rocket and shooting star of the Space Guard. He unfastened the emblem, pocketed it. Its polished gleam might catch an inimical eye here in this world of unknown terrors. Only a fool courts danger.

An ear-splitting scream of greed and triumph halted, froze him to the spot. There, scrambling down the opposite side of the funnel-shaped cleft, raced a green monster that defied his sense of comparison. A mastodonic myriapod, each cylindrical leg a foot in diameter. A head that terminated in a monstrous bifurcated beak, swung on a flexible neck. Huge boulders and shells sprayed from groveling splay-toed feet.

Eon Hermer knew a moment of unparalleled fear, even though he became aware that the globular eyes, protruding high in the beak, were focused on the incubator of little yellow men. Avalanching down, the beak crushed the transparent conical roof, and began to snap up the xanthic men, rearing its head viciously to gobble them down. Their frantic cries sounded pitiable and infantile.

It was a soldier of space that responded almost instinctively. The terrestrial knelt and discharged the dissembler weapon.

For one instant, striated lines of violet barreled out. A foot-wide swat of nothingness emptied out of the deradiated atoms of air and green flesh. Outside atmosphere, rushing into the dead vacuum, clapped together and resounded like thunder. Sand rustled up with the air-suck, revealing his strategy in kneeling.

Three giant legs of the myriapod had been destroyed. The beaked head dropped a nymphlike troll in mid-air. It wabbled hesitantly, sighted the officer abruptly and charged across the badly crushed incubator.

He fired again, but felt his finger tremble on the focus, and it was a clean miss. He couldn't have missed that last shot. The myriapod occupied most of the horizon. The striated convolutions appeared, followed by the whipcrack of thunder, and quieted to reveal a collapsed bundle of greenish flesh, sliding down the declination.

Eon Hermer flung the dissembler weapon aside disgustedly. Its three blasts were gone, leaving but a useless chunk of metal as protection against a strange world of such ferocious denizens. Out of the strange horizon came startled cries and eerie squeaks, revealing that other beings had been aroused. Turning swiftly, he ran along a rude gravelly runway, his curiosity sated utterly concerning the malformed inhabitants of this dead star.

HE stumbled over what looked like a low shrub. Something clung, his ankle twisted. He went down, glimpsing a crustaceous valve opening from the rocky surface, a sluglike being that stirred ponderously and spat forth a few drops of oily liquid that struck his bare hand and burned hotly up the nerves. He tried to move his arm, and his opposite leg moved. His body jiggled erratically as though afflicted with St. Vitus dance. The few drops of poisonous liquid had short-circuited his nerves in such a fashion that his thought commands became hopelessly sidetracked along the nerve chains.

Helpless horror overcame him as a row of gaping mouths opened like raw wounds for his traitorous flesh. His last memory was of a ribbon of orange light bathing his attacker fluorescently. Then ecstatic envisionment. Yellow wings, beating against a pinkish background. Memories of l o n g months, following the elusive Masons across interplanetary space. A more brilliant dream persisted.

That of a woman seated on the ruins of a wrecked space ship, half buried in sand. Broken bits of metal stuck up into the sky. Twisted girders like metallic entrails. M o r e terrible though, was the respectful esteem of the strange yellow men who formed a large circle about the space ship, with jagged vitreous pikes on guard. Yet she was quite terrestrial when she smiled. Dark eyes. Hair with the lustrous yellow of sodium flames.

"You're coming around, Captain," she said. "I'm glad you came for me at last." Her tones shattered unreality.

"Came for you!" exclaimed Eon Hermer dazed. "Who are you?"

Her lips became a small impatient "o". "I'm Jewel Collahan," she said. "And you're of the Space Guard. I know I'd be missed sooner or later."

Then it wasn't a dream! The girl stiffened a bit haughtily.

"You spoke your thoughts aloud. May I take that as a compliment?"

On his feet, Eon Hermer rubbed his head wonderingly.

"You can, at that," he said after a second look. "But don't get me wrong. I've never heard of you, and I'd never have been on Vaporia if I hadn't been shoved off, very much against my will."

"Shoved off!" She seemed about to cry. "You were marooned! And I've been waiting for two years to get off this biological madhouse."

Hermer chuckled. "That is a bit odd," he asserted, "waiting two years for rescue and then receiving another derelict for a companion."

"There's nothing funny about it!" snapped Jewel Collahan decisively. "And if you'd use your eyes you'd see you were still on Vaporia, Captain." Lieutenant Hermer looked up. Rigel, pink as ever, glared unmovingly from its diminutive marble size overhead.

"Oh, well," he ventured. "Perhaps I should have picked some other planet of Rigel to get marooned on!"

SHE was quick to catch him up. "There are none," she proclaimed scornfully. "Vaporia is a dead star, out of its gravity range. Have you forgotten that Rigel gives off light so intensely that its light pressure is two hundred and fifty-six times that of the sun, which counteracts its gravity pull."

"Pardon my astronomy," agreed Lieutenant Hermer. "I don't get around this way often." He told her of his exact predicament.

"Vaporia is a virtual prison!" exclaimed Jewel Collahan. "These yellow insect people are very amiable and tractable, although they can fight viciously with what science they have when aroused. They're grateful to you. A detachment of them had set out to examine the incubator, placed in a high region to get the full rays of Rigel, and witnessed your brave attempt to save their incubator; they arrived in time to rescue you from the spitting crowl, and brought you here. Your nerve-shorting paralysis has worn off by this time. They will do anything in their power to aid you in finding the Mason brothers, if they have indeed landed for restocking."

"That's an idea!" ejaculated Eon. "Could they locate the space ship?"

"I'm sure they could! They might bring the fugitives sooner than you think. They have an extraordinary system of telepathic communication," answered Jewel. Lieutenant Hermer ran his hand over his aching muscles; his expression gave the girl momentary misgivings, not knowing he was thinking of the Mason brothers.

"In that case, I'll get you back to Earth, and be glad to," he promised. Jewel Collahan shouted a command in an odd tone, at which the attentive bodyguard of Vaporians answered in short, crisp syllables. Presently they began to depart in flying groups, fading into the lavender distance. Perhaps the loss of his triple-charge weapon had not been at too dear a price, after all.

"I came to Vaporia on an ill-fated expedition," said Jewel ruefully. "There is what remains of the *Void Plover IV!* Rocket tubes blown away at the take-off."

It had been an unwieldy rocket vessel, quite unlike the trim gravito-propulsion patrol craft of the Space Guard. "Overloaded?"

"I suppose so," she admitted. "I came to trade gaudy trinkets for curious pebbles they use as a medium of exchange here, that are almost priceless on Earth. It was easy. Before I knew it I held the controlling share of their money exchange system, had tied up the economic balance and almost started a depression."

"They're more human than I thought," admitted Hermer.

"After the rocket-tubes smashed," continued Jewel Collahan, "I couldn't see the Vaporians suffer, and returned the coruscants."

"Coruscants!" ejaculated Eon. "That's queer. They're worthless. They're mining them out of the moon."

She led him toward the adjacent side of the ruined *Void Plover IV*. From a pile of rocks a leather-winged bird soared, plunging down into the tortuous chasm that opened before them. The Vaporian City was composed of crude mud structures, stuck on the precipitous walls of the chasm like wasps' nests. From various apertures he perceived chitinous lemon-yellow features, staring in a manner not unlike inquisitive humans.

AS they moved along the gorge's floor, small flying creatures were aroused. Insectlike things. Leathery bull birds. Others had no earthly simile, but floated around on fragile wing-spumes. Tiny seed-pod parasols soared by, hurling themselves like twirled pie pans but never hitting anything, since they seemed to possess an animalistic instinct. Jewel called them Spaerella. Flying plants, akin to microscopic unicellular plants on Earth, the Protophyta, with dilating flagella to propel them through water. Vaporian science was unique.

"It's mostly natural science," she explained. "The yellow Vaporians utilize few implements. The orange emanation you saw destroy the spitting crowl was a natural electric emanation that comes from them when aroused."

Without warning the light of Rigel was suddenly extinguished. Stygian night descended.

"I forgot!" she exclaimed. "It's the night period. You see there is a swarm of meteorites circling Vaporia, and ever so often it eclipses Rigel. These periods don't last long."

Lieutenant Hermer was learning something every minute. He was suddenly aware of the soft warmth of her nearness. She must have stumbled in the dark, for their lips came together quite by accident. He was so amazed that he held her thus for a thrilling moment. Then blinked.

"That was a fast ten minutes," he remarked in confusion, for a beam of light was cutting a white cylinder down out of Tartarian gloom.

"I—I don't understand," stammered Jewel Collahan. "That's not Rigel."

"I do!" whooped Hermer. "It's the search beam of the Space Guard patrol vessel. I'd know her anywhere." The beam swept over, wavered, became motionless over a high shelf where lay the ruins of the Void Plover. "They're descending. Can you take me up there on the run? It may mean—" For answer her hand fitted snugly in his own and they headed

out pell-mell through the blackness.

The cylinder of light was a mere slanted hyphen, glaring across at the ruins and reflecting dimly back to the sleek ovoid lines of the moored Space Guard vessel. Two grotesque figures, clad in transparent bell-like helmets with shoulder tanks, came cautiously out of a low airlock, each with dissembler at hip. The Mason brothers distrusted the air of Vaporia. They took no chances. Like divers on an ocean floor, they ventured through the wreckage. Hermer writhed inwardly with disgust. Avarice had brought the Mason brothers down, a hope that treasures might be gutted from the derelict, and need of water.

All at once something was happening. Brackish shadows were moving into the light, a circle of yellow figures. A closing cordon.

"Make for the patrol ship," gasped Lieutenant Hermer. "If I get to those controls they'll think a comet backfired." He carried with him water element tanks.

Halfway across the intervening distance the pinkish light of Rigel reappeared with a vivid glare; the meteorite swarm had passed. Swerving around a huge boulder, they leaped into the open airlock, as an alarmed shout sounded behind.

EXCLAIMING exultantly, Lieutenant Hermer sprang to the guiding mechanisms. Jewel was gasping like a fish out of water, but she moaned at what she saw beyond the glassite. The Mason brothers were retreating slowly toward the patrol ship, unharmed. After all, the yellow Vaporians had been told merely to find the brothers, not to destroy them.

The ovoid patrol ship rose as softly as a feather, gained momentum. Vaporia fell away rapidly. A hideous, bulbous face, as scarred and pocked as a full moon, passed a circular spaceport. Alf Mason! Jewel Collahan screamed. After all they had passed through, the Mason brothers had not been eluded. They had clung to the outer degravite shutters like flies. Soon the mass gravity of the space ship would carry them along as satellites.

An insistent tapping came from the glassite prow. Alf Mason hung there, eyes shot through with fear and desperation. In his hand he held destruction—the dissembler—not only for those within, but for himself as well. If he shattered the glassite, the inner air would escape, leaving them in a vacuum. So he hesitated.

Over his helmet the pinkish rays of Rigel had ballooned to white hot intensity. Vaporia's atmosphere was left behind. Lieutenant Hermer looked sternly ahead, set the controls at full acceleration. Alf Mason grinned, knowing his body would be accelerated along with the space ship.

Darting across vacuum now. Alf's lips were moving. At a sideport, Mope cringed, his fat sweating face a terror mask. Demanding. Pleading. Screaming that they be let in. And Rigel's blinding flames expanded, became more intense. Suddenly it seemed as if a gigantic hand clutched at the men on the outer hull. They were scraped away and back into space. Alf's incredulous face gyrated away as his space-togged body was ripped back.

Out around Rigel. Out where the intense light pressure exceeded the gravity of a giant sun. Even old Sol had light pressure, as was evinced by tails forming on near comets, but this was two hundred and fifty-six times as great. Yet the gravitational thrust of astral bodies to the rear had shot the patrol vessel into that "no man's land" of space, and the Mason brothers had been plucked away by an invisible repelling force.

He turned to explain what had happened to Jewel, but found her staring back at a black dead world outlined vaguely against Rigel's rays. "I'm glad to get away," she said, "but somehow it makes me feel a little blue to leave the Vaporians."

Off to one side of the stern, two bright flashes appeared against space, so close together as to look like eclipsing binaries, or double suns. They twinkled momentarily, and were gone, like instantaneous novas. Only Hermer knew what they signified.

ZARNAK

By Max Plaisted

The Strange Deluge

IN THE YEAR 2937 I, ZARNAK --- AN EARTH SCIENTIST ---- FOUND MYSELF ON THE PLANET MERCURY

THROUGH THE HELP OF ETARRE, A BEAUTIFUL GIRL, NOT AT ALL LIKE THE PEOPLE OF MERCURY, I HAD ESCAPED FROM THE DISSECTING ROOM OF A MERCURIAN SCIENTIST. THEN, THROUGH STRATEGY, WE ESCAPED FROM THARK, RULER OF A TRIBE OF INSANE PEOPLE. ETARRE DIRECTED MY SPACE PLANE TOWARD A HUGE VOLCANIC MOUNTAIN ON THE COLD, DARK SIDE OF THE PLANET MERCURY.

A POWERFUL MAGNETIC RAY DREW US INTO THE HOLLOW CENTER OF THE MOUNTAIN AND WE LANDED AT THE GATES OF A BEAUTIFUL, UNDERGROUND CITY. I WAS LED BEFORE VAECO, AN AGED MAN, KNOWN AS "THE SUPREME ONE," WHOM ALL THE MERCURIANS FEARED AND BELIEVED TO BE A GOD. HE ORDERED ME TO THE TORTURE CHAMBERS.

THEY BEGAN GIVING ME THE FIRE TORTURE

STOP THE TORTURE ···THE SUPREME ONE COMMANDS

WE GRADUALLY LOWER THE SPIT!

WHAT NEW DEVILTRY WILL THEY TRY?

THEY GAVE ME BACK MY CLOTHES. I WAS LED BEFORE THE SUPREME ONE, WHO, TO MY ASTONISHMENT, GREETED ME WITH OUTSTRETCHED HAND.

WELCOME, ZARNAK, TO MY DOMAIN. I'M VAECO ---SELF-APPOINTED RULER OF MERCURY. ETARRE, MY DAUGHTER, TELLS ME THAT YOU ARE FROM EARTH ----SO I APOLOGIZE FOR MY ACTIONS. I HAVE NOTHING TO FEAR FROM EARTHLINGS -- BUT I DO FEAR THOSE FROM VENUS. YOU SEE, ZARNAK, I MYSELF AM FROM VENUS. WE VENUSIANS ARE A HIGHLY INTELLIGENT RACE --- AND BY SELECTED BREEDING FOR COUNTLESS CENTURIES HAVE CONSTANTLY IMPROVED THE MENTALITY OF OUR PEOPLE. YOU WONDER WHY I AM ON MERCURY? COME WITH ME TO MY APARTMENTS ···I WILL TELL YOU THERE!

SO VAECO TOLD ME HIS STORY. "NINETEEN OF YOUR EARTH-YEARS AGO, A BABY GIRL WAS BORN TO A GREAT SCIENTIST OF VENUS. I WAS THE FATHER. ·····

ISN'T SHE BEAUTIFUL?

BUT ISN'T IT A PITY, MASTER? HER HEAD IS SO SMALL!

THEN, A FEW DAYS LATER, THE INSPECTORS CALLED ON ME

WE UNDERSTAND, VAECO, THAT YOUR CHILD IS SMALL-HEADED. YOU WILL, OF COURSE, HAVE HER READY TO PLACE ABOARD THE EXILE PLANE TO MERCURY. IT IS SAD THAT SUCH AN ATAVISM SHOULD BE BORN IN YOUR FAMILY, BUT FOR THE FUTURE OF OUR RACE, SHE MUST GO ON THE EXILE PLANE!

MY WIFE WAS FRANTIC--WE WERE ADVANCED IN YEARS, IT WAS OUR ONLY CHILD. I HAD EXAMINED THE BABY CAREFULLY ---AND WHILE HER MENTALITY WAS NOT AS ADVANCED AS OTHER CHILDREN --SHE WAS FAR FROM BEING AN IDIOT

WHAT SHALL WE DO, VAECO, MY DARLING? I CANNOT LET ETARRE GO. OUR ONLY CHILD-- SHE WILL DIE AMONG THOSE INSANE PEOPLE!

HUSH, DEAR, NOT SO LOUD. I WILL FIND A WAY!

AND SO WHEN THE EXILE PLANE ARRIVED AT MY DWELLING, TO PICK UP MY GIRL, MY SERVANTS AND I KILLED THE OPERATORS AND TOOK COMMAND OF THE PLANE

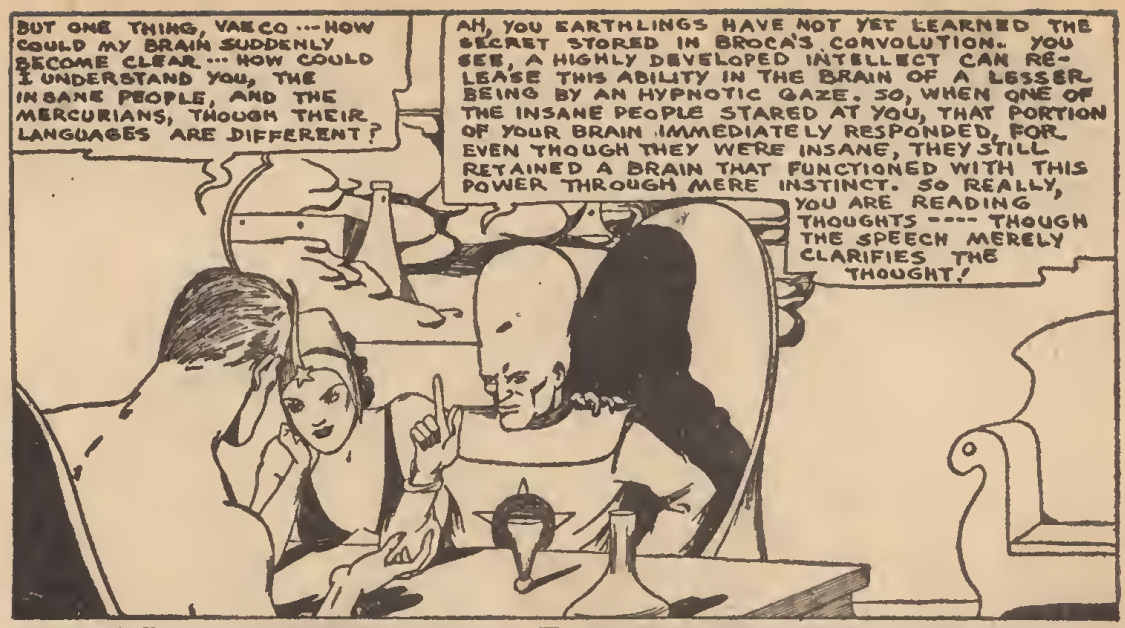
KILL THEM! DON'T SPARE A MAN! SHOOT IN THE HEART REACTION GAS---- IT WILL SPREAD THROUGHOUT THE PLANE!

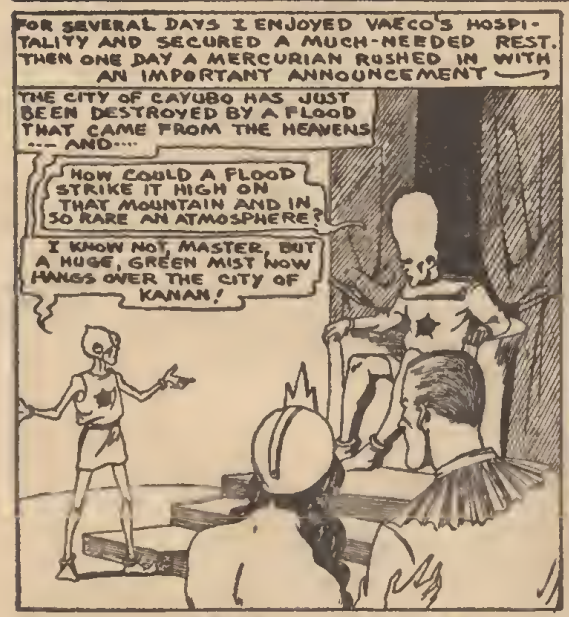
SO, HAVING SEIZED THE PLANE, WE HEADED IT STRAIGHT FOR MERCURY

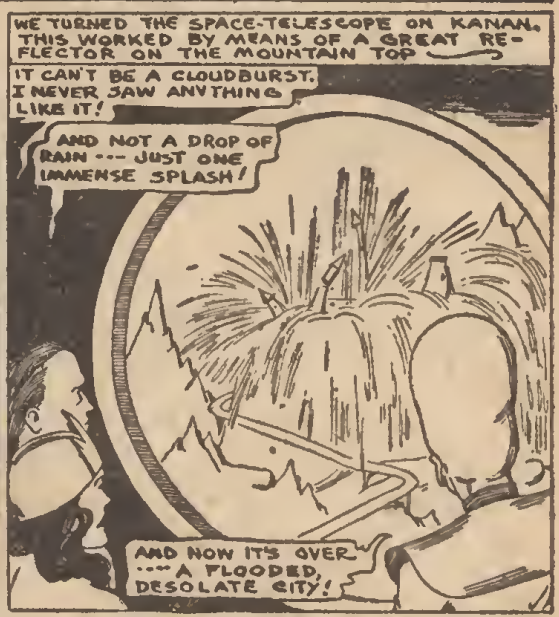
AND SO, I AM HERE WITH MY DAUGHTER. HER MOTHER DIED YEARS AGO. YOU SEE, FOR CENTURIES THE VENUSIANS HAVE BEEN SENDING ALL INSANE PEOPLE AND ALL MISFITS TO MERCURY. THAT HAS KEPT THE RACE ON A HIGH PLANE. THESE DEMENTED EXILES LIVE A WILD, BARBARIC LIFE HERE ON MERCURY--- SPLIT INTO QUARRELING TRIBES!

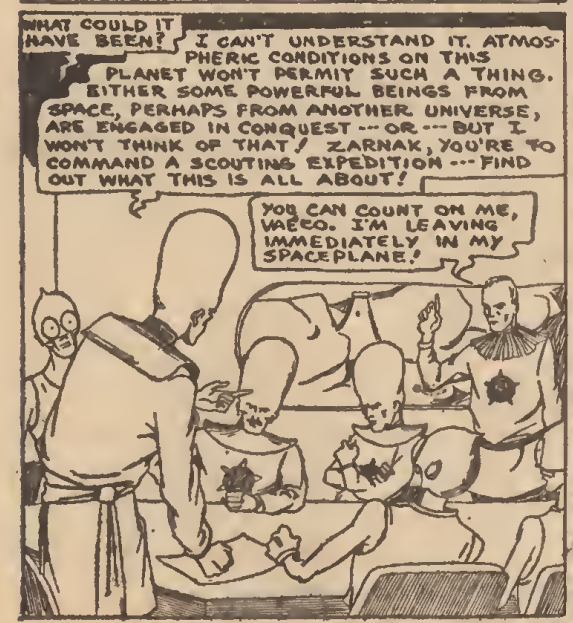
OUR SPIES---- WE HAVE MANY OF THEM IN THE MERCURIAN CITIES ---- TOLD US OF YOUR ARRIVAL. WE ALWAYS FEAR THAT THE VENUSIANS WILL COME TO WREAK VENGEANCE ON FATHER. HENCE, I WENT TO SEE IF YOU WERE ONE. ASTOUNDED AT YOUR APPEARANCE, SO LIKE MY OWN, I DECIDED TO SAVE YOU!

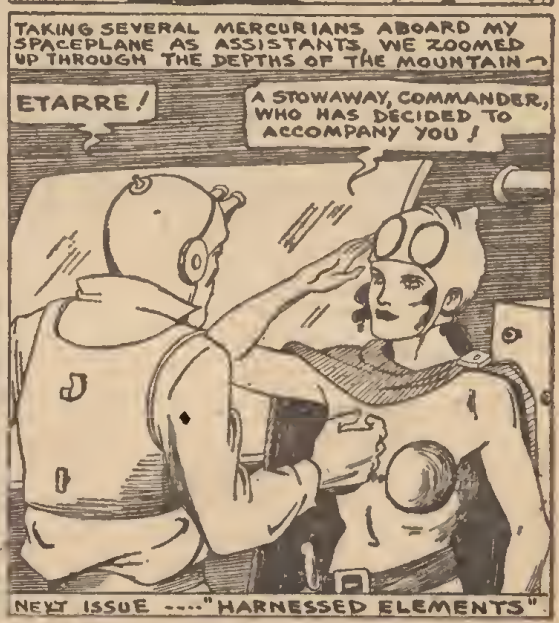
SO HERE YOU ARE. IT WAS EASY WITH MY SUPERIOR KNOWLEDGE TO LORD IT OVER THE SIMPLE-MINDED MERCURIANS. TO THEM I AM A SINISTER INFLUENCE DWELLING IN THIS MOUNTAIN ----- BUT REALLY, I LEAVE THEM PRETTY MUCH ALONE, UNLESS THEY DISOBEY. I HAVE GIVEN THEM MANY SCIENTIFIC THINGS THAT HAVE ADVANCED THEM REMARKABLY---IN A FEW GENERATIONS THEY WILL BECOME QUITE CIVILIZED. I HAVE HARNESSED THE HEAT, DEEP IN MERCURY, TO FURNISH ME LIGHT, ENERGY AND WARMTH. I CONTINUALLY ENLIST MERCURIANS IN MY SERVICE --- THE ONE WHO ACCOMPANIED YOU WILL SOON BE A TRUSTED SERVANT. LIFE HERE IS QUITE GOOD!


BUT ONE THING, VAECO --- HOW COULD MY BRAIN SUDDENLY BECOME CLEAR --- HOW COULD I UNDERSTAND YOU, THE INSANE PEOPLE, AND THE MERCURIANS, THOUGH THEIR LANGUAGES ARE DIFFERENT?
AH, YOU EARTHLINGS HAVE NOT YET LEARNED THE SECRET STORED IN BROCA'S CONVOLUTION. YOU SEE, A HIGHLY DEVELOPED INTELLECT CAN RELEASE THIS ABILITY IN THE BRAIN OF A LESSER BEING BY AN HYPNOTIC GAZE. SO, WHEN ONE OF THE INSANE PEOPLE STARED AT YOU, THAT PORTION OF YOUR BRAIN IMMEDIATELY RESPONDED, FOR EVEN THOUGH THEY WERE INSANE, THEY STILL RETAINED A BRAIN THAT FUNCTIONED WITH THIS POWER THROUGH MERE INSTINCT. SO REALLY, YOU ARE READING THOUGHTS ---- THOUGH THE SPEECH MERELY CLARIFIES THE THOUGHT!


FOR SEVERAL DAYS I ENJOYED VAECO'S HOSPITALITY AND SECURED A MUCH-NEEDED REST. THEN ONE DAY A MERCURIAN RUSHED IN WITH AN IMPORTANT ANNOUNCEMENT
THE CITY OF CAYUBO HAS JUST BEEN DESTROYED BY A FLOOD THAT CAME FROM THE HEAVENS --- AND....
HOW COULD A FLOOD STRIKE IT HIGH ON THAT MOUNTAIN AND IN SO RARE AN ATMOSPHERE?
I KNOW NOT, MASTER, BUT A HUGE, GREEN MIST NOW HANGS OVER THE CITY OF KANAN!


WE TURNED THE SPACE-TELESCOPE ON KANAN. THIS WORKED BY MEANS OF A GREAT REFLECTOR ON THE MOUNTAIN TOP
IT CAN'T BE A CLOUDBURST. I NEVER SAW ANYTHING LIKE IT!
AND NOT A DROP OF RAIN --- JUST ONE IMMENSE SPLASH!
AND NOW IT'S OVER --- A FLOODED, DESOLATE CITY!


WHAT COULD IT HAVE BEEN?
I CAN'T UNDERSTAND IT. ATMOSPHERIC CONDITIONS ON THIS PLANET WON'T PERMIT SUCH A THING. EITHER SOME POWERFUL BEINGS FROM SPACE, PERHAPS FROM ANOTHER UNIVERSE, ARE ENGAGED IN CONQUEST --- OR --- BUT I WON'T THINK OF THAT! ZARNAK, YOU'RE TO COMMAND A SCOUTING EXPEDITION --- FIND OUT WHAT THIS IS ALL ABOUT!
YOU CAN COUNT ON ME, VAECO. I'M LEAVING IMMEDIATELY IN MY SPACEPLANE!


TAKING SEVERAL MERCURIANS ABOARD MY SPACEPLANE AS ASSISTANTS, WE ZOOMED UP THROUGH THE DEPTHS OF THE MOUNTAIN
ETARRE!
A STOWAWAY, COMMANDER, WHO HAS DECIDED TO ACCOMPANY YOU!
NEXT ISSUE ----"HARNESSED ELEMENTS"

VISION of the HYDRA

Ten Minds Are Housed Within a Single Skull Performing Miracles Beyond Imagination!

By GORDON A. GILES

Author of "Dimensional Worlds," "The Sun that Cracked," etc.

What does it profit a man if he gain the whole world and lose his own soul?

THESE words occur to me as I prepare to write this story. For in a sense, Dr. Alanson Willenborg did achieve the former and suffer the latter. You must have heard of him; his name has frequently been linked with Freud's. His intellectual talents became apparent even in his first year at college, when he wrote a theme paper that threw his professors into a turmoil. By his senior year he was recognized as the soon-to-be Einstein of psychology.

His graduating thesis flung wide the doors to what he called "cosmic psychology," and he was promptly tendered—or begged into—the chair of Professor of Psychology at Midwestern.

For six years his brilliance stood prominent, resulting in a ten-volume work on mental phenomena from which he made a small fortune. Then, against all inducement, he retired from academic pursuit. He was thirty years old at the time.

The psychiatric world had waited

"I have the vision of the hydra," the tenth head said.

with bated breath for him to elaborate on his theories of "cosmic psychology," but he left them hanging in mid-air. It left a furor that died away only gradually.

THE maid left to announce me, and I stared around appreciatively at the elegant arrangements of this lounge in Dr. Willenborg's Oak Park home. I caught the feminine touch in the soft-hued draperies and woodland pastels, and knew that Jondra, his wife, had been the decorator.

Jondra! I almost ran out then in a small panic, but already I heard her soft footsteps.

"Why—Charles!"

One look at her tender blue eyes, her golden auburn hair and I knew that I had not stopped loving her, even though I hadn't seen her for five years. I don't know what silly things I said in greeting, nor what she answered, but I felt the old pain of lost happiness. Alanson and I, roommates for two years, had both courted Jondra, and he had won. Yet there had been a time when Jondra had seemed to favor me. Bittersweet memory!

I stiffened, aware that these wretched memories were showing in my face and embarrassing her, and forced myself to seem light-hearted.

"Jondra—how's Alanson, the old champion soda-destroyer?"

A minute later, as if glad to end the brief tête-à-tête, Jondra led the way to his study, leaving me at the door with a strange, haunted smile that was later to have great significance.

Alanson Willenborg was the same as when I had known him in college—tall and athletic, cold and suave. His face was the same unsmiling, grave face of the scholar and thinker. It did not change in the slightest as he shook my hand, and his eyes reflected those hidden flames that indelibly stamped him as the genius.

I did not feel the awkwardness in his presence that I had with her. Somehow, the *human* things didn't matter with him. I could just feel that his reasoning on the subject would be—"I wanted Jondra. You wanted Jondra. I got her. That's that."

After he had greeted me and motioned me to a chair, he sat down at a horseshoe-shaped desk and began tapping at a shorthand machine. And now, how can I tell the rest without sounding incoherent? For he then extended his left hand toward another shorthand machine and began manipulating that! And if I had not been too awed to notice at the moment, I would have heard the soft drone of a phonograph's voice coming from a receiver hung from the low ceiling just beside his left ear.

"Don't think I'm neglecting you," said Willenborg, just as a deep flush burned over my face. "On the contrary, my right ear and a good share of my mind are at your service!"

I started to my feet, angry at his insinuation—how could I know it *wasn't* that?

"If you're so busy, Dr. Willenborg," I sputtered indignantly, "I wouldn't want to intrude. I—"

"Sit down, Charlie old boy. And the name's Lanny!"

HE gave me one of his rare, disarming smiles that for a moment melted the intellectual mask on his face.

"You think," he went on as I sank back, "that I'm giving you an insultingly small part of my attention. As a matter of fact—if you can believe me—I'm more attentive than anyone else in the world could be!"

I knew I looked foolish.

"Really, Dr. Wi—Lanny, I—I—"

"Listen," explained the man I had known for years and yet had never known, "with my left and right hands I am writing two separate treatises in shorthand, one on symptomatic paranoia, the other on specific shell-shock. The bifold speaker next to my left ear is delivering two separate discourses on hypnotism and hallucination. Yet"—his lips smiled ever so slightly—"I could discuss with you, with ease, the internal traumatic effects of hysteria, or any other technical topic!"

Well, there you have it. Yes, impossible—but he was doing it; that was proven later. At the moment I didn't believe him either; conjectured he was

playing some elaborate trick on me.

"Look here, Lanny," I stammered. "I've heard of gifted persons writing a letter and talking over the telephone at the same time, but—"

"Child's play!" interrupted Willenborg. "Psychologists have long suspected that there is a great deal of latent power in every brain, and that the average person uses only one-tenth of it. Scientists, scholars, thinkers of one kind or other use perhaps twice or three times as much, but that is still a small part of the total potentiality of the mind. Applying myself to this problem of psychogenesis, I've succeeded in training myself to use fully one-half of my brain capacity!"

A half wit! This queer, irrelevant play of words flashed across my mind, and I had to strangle an involuntary chuckle. For an instant it looked ridiculous—his two hands flying steadily over the complicated keyboards of the shorthand machines, the voices that came to me as soft hisses pouring into his left ear. And yet—

"You see, Charlie," he spoke again, as easily as if doing nothing else but that, "the human brain is not a unit organ at all. It is actually composed of mental segments, each of which alone can motivate the individual from birth to death. People that rise above the average are those who have learned —unconsciously indeed—to use two segments. Exceptional figures in human life use perhaps three. Geniuses use four."

"Einstein," I ventured, "used five?"

Willenborg visibly sneered.

"Only one person in the world ever used five out of a possible ten parts of his brain. And that—"

"Is you!" I cut in blandly. I arose with studied indifference. "I have an appointment—"

I walked out. Why? You would have done the same, driven by an overwhelming sense of inferiority in the presence of Dr. Alanson Willenborg. As I stepped down the hall, wrapped in the remnants of my pride, I told myself I would never see him again.

I hoped, though, to see Jondra once again—I even looked around for her hopefully in the luxurious lounge. But the maid—undoubtedly sent by the doctor—politely led me to the front door.

The cool night wind lashed my flushed face. I tried to force Jondra out of my mind.

IT was inevitable that I should go back to that brownstone house set back in a small grove of tall oaks. It was a week later, and in that interval I had attended the Midwest Conference of Physicians, and several other less formal gatherings of medicos in Chicago. At the same time I had made casual inquiries about Dr. Willenborg among the psychiatrists.

"A loss to science." "Unsocial chap, but a genius." "What has he been doing in the past two years since retiring from the chair?" These were some of the reports to my anxious queries. You see, for a young surgeon in the East, I had been quite out of touch with things in the psychiatric field. And I had been trying to forget Jondra.

Trying to forget! I should have known that was as impossible as forgetting there was a sunrise, or forgetting to breathe. This second time I called she seemed overjoyed to see me, and we talked over college days for an hour before I went in to the doctor's room.

"Lanny," I said as she accompanied me down the hallway, "is a little—well, changed."

"Yes," she whispered. She stopped abruptly, faced me with eyes that were vacant. I knew then and there that she was not happy. "Changed!" she cried. "If you only knew! Oh, Charles, what is he doing?"

With that she hurried away. I knocked on the door to Willenborg's study with a grim wonder. As I stepped in, I felt an immediate sense of smallness, of inferiority. Alanson was sitting at his horseshoe desk, both hands busy, but this time writing in longhand instead of working shorthand machines. Back and to the left of his head the speaker was droning out words steadily, two sets of words that sounded like a jumble to me. Then I noticed that he was reading also, from a book lying on the desk before him!

"I knew you'd come back, Charlie," he said gravely, a hint of mockery in his voice. "Curiosity is always stronger than pride."

"I—I came mainly to see Jondra," I snapped back.

"So!" He raised his eyes from the book for just a second. "You never married, Charlie?"

"I'm a bachelor simply because that suits me!"

Weak words; futile attempt to conceal the truth.

Abruptly, he changed the subject.

"Tell me, Charlie, what does dissection of the human brain show in relation to thinking processes?"

"It shows an uneven distribution of convolutions, and—"

"That's enough," interrupted Alanson. "In plain words, part of the brain is well used, but most of it is not. Why should not the whole brain be concentrated in activity?"

"It would wear the brain out," I suggested.

"Bah!" he snorted. "Superstition. The brain is the strongest organ in the human body."

"Then why is there so much insanity?" I asked quickly.

"Not, as you and the herd think, because the brain is over-used, but because it is used wrongly. A brain trained to think constructively will never go under, even though it is taxed to its full capacity."

"And that is what you are doing?"

HE shook his head sharply.

"Exactly. Two years ago I left the chair of psychology at Midwestern to carry out this plan of applied telesis. Telesis, you know, is self-improvement. I started by training myself—or my brain—to talk with Jondra and write technical articles at the same time. Then I learned to write with my left hand, and thus added the third separate operation. It was but a step to add a voice, and to train myself to understand two together. Then I developed the operation of speaking with these four other operations going. Finally, during this past week, I've added the ability to read, which makes a total of six operations I can concentrate on simultaneously.

"It becomes easier to add operations, strange to say, as I go along. I expect to reach my limit in a month or so, which will probably be ten distinct activities at once!"

I gulped.

"Easy enough to say you are doing six distinct things," I said, "but do you honestly understand every word of the two voices from the speaker? Are you writing two coherent themes? And do you grasp what you are reading? All this while talking to me?"

"Certainly!"

He stopped his writing suddenly and tore two sheets of paper off the pads to his right and left. They were long sheets of paper, and as he handed them to me, I saw they were inscribed with his fine, clear script. I glanced at the first sheet. His words were as straight to the line as though ruled. It began—

> You are wearing a navy blue suit, with a red and black striped tie, button-neck buff shirt, and brown shoes. You have a razor nick on your right cheek. This is to prove that what follows was written since you've been here, while we were conversing. I will list following the rules of geometry. One, a straight line is the shortest—

The page went on, leading to the complicated propositions of spatial geometry. My eyes bulging, I read the second sheet. It, too, began with the proof that it had been post-written to my entrance, and then went on to list the planets of the Solar System—diameters, mean distances from the sun, periods of revolution.

While I was still gaping at this, he thrust the book he had been reading into my hands, and recited the preceding page almost word for word. When he challenged me to check the phonograph monologues against his memory of them, I gave in.

"A remarkable feat," I tried to say casually.

He smiled faintly and looked at me in such a way that I felt myself shrinking to the size of an ant.

"Not remarkable," he shrugged, "in the light of what I'll be able to do later!"

I was to remember those words, which he said with an odd look in his

eyes. I did not lose the ant-size feeling until I had left his home and walked around in the night air for an hour.

IT was about a month after my first visit that I again invaded the quiet precincts of Oak Park.

I did not meet Jondra this time; she was out motoring, the maid told me. I walked to Alanson's room, strangely aware that I would not be interrupting him, even though unannounced. At the most, he would only be transferring his attention from one of six operations to me!

But I was wrong—it was now eight operations!

The seventh was a coded clicking that came steadily from a telegraph sounder on his desk. The eighth, briefly, was a photoelectric outfit, in which his swinging foot interrupted the beam in dots and dashes that were recorded on a moving tape.

He glanced up briefly from his book as I entered, but his flying fingers did not pause a second in their manipulations of the shorthand machines at either hand. He spoke softly above the steady drone of the twin phonograph voices near his left ear.

"You will notice that I've added two operations. The seventh is a discourse on radio-therapy in the international code. The eighth is my rendition, in the Morse code, of Shakespeare's *Hamlet*. Each operation indicates that a separate portion of my brain has come to life consciously, and has joined my wakeful mind. My brain is perhaps only two out of ten parts subconscious now."

"But—but which is *you?*" I demanded, for I had been trying to puzzle that out. "Are you the part that is talking to me, or the part that reads, or the part that is moving your leg rhythmically, or—"

"Which part of your brain is you?" countered Alanson. "The part that dreams while you sleep, the part that builds your air castles, or the mental segment that calls itself—consciously—'I'? Here I am doing eight things at once, and I am aware of doing eight things! As when you listen to a duet and hear both voices. It is astonishingly simple."

But watching him closely, I saw a vague look of strain on his face. And when he suddenly abandoned all his operations and left the desk, I saw the strain was still there. He looked harassed, fatigued.

He faced me, then, for the first time as a normal person doing just one thing.

"Sit down," he invited. "I feel the need of a short rest, although my brain is as fresh as ever."

"Do you eat and sleep?" I asked wonderingly—and foolishly.

"Of course," he returned gravely. "In fact, I lead a model life, and have for two years, since I started this. I am on a very sensible diet. I sleep exactly eight hours each night. I swim daily in my private pool, and take frequent long walks. All the rest of my time and energy is spent on this project."

All the rest of his time! I reflected a bit bitterly that Jondra had been left out of his scheme entirely.

"And much of my money," Alanson was saying. He waved a hand. "Most of these gadgets have been quite expensive — phonograph recordings of scientific subjects, special shorthand machines, and then this new automatic telegraph instrument. But when I have added two more operations, I'll reach my goal—having my entire brain *conscious*, instead of most of it subconscious and useless, with all its inhibitions, primary superstitions, and unreasoning. I'll have a tenfold brain, so to speak."

AFTER a moment he added—"I'll have the hydra-vision!"

"What?"

"Hydra-vision. You remember the hydra in mythology, with its nine heads, and one that was immortal? Well—with its multiple minds, it must truly have had an expansive viewpoint of the world and the Universe. Thus hydra-vision would be contemplation of the cosmos with the collective power and scope of ten minds working as one."

I was puzzled.

"It seems to me you're off the track, Lanny. You may succeed in awaken-

ing the ten mental segments, but what good will it do? You'll be able to think of ten different things at once, but of *no one* more clearly than before!"

A ghost of a smile hovered over his lips as he answered.

"My plans go on. After I have awakened my entire brain, I will train all ten segments to think at once, and concentrate on one thing! A genius like Newton used perhaps four segments as one. Think of having more than twice his mental power! A person so equipped might well discover whole new fields of thought and science."

"He would be a mastermind — a superman," I said.

"Which are just synonyms for genius. Genius is less remarkable than the fact that mankind in general is so backward! Various philosophers and Utopians have sensed that, especially Alexis Carrel, who in his book, 'Man the Unknown,' suggests that if civilization did as much for the mind as it has done so far for the body, mankind would become a race of supermen. Yet not supermen, but the men they should be! In other words, the mind of man has been left undeveloped all out of proportion in comparison to all our other ambitions. Instead, we make frantic attempts to climb Everest, conquer the stratosphere, and dig oil for machines that take us everywhere, but nowhere."

After a moment he added, introspectively—"The follies of mankind!"

I came to my feet as the door opened and Jondra entered. From the surprise on her face I knew that she did not often see Alanson away from his horseshoe desk. For an instant their eyes met, locked. In Jondra's eyes I saw anguish; in Alanson's, indifference. Deeper in their eyes I saw on the one hand blind devotion, on the other, a certain veiled pity.

Then Alanson excused himself and went to his desk. Jondra and I walked out of the room as the cacaphonous chorus of clickings and multiple phonograph voices began once again.

MY new post in a Chicago hospital kept me away from the Willenborg home for ten days. In that time Alanson had succeeded in mastering his last two operations. Jondra told me about it before I went in to see him. It seemed he had simply added two more phonograph voices.

"Yesterday," she concluded, "he had me come in there and ask him questions. He answered them without hesitation. And now—"

She choked as she went on—"and now I feel he's lost to me altogether! Not even that tenth part of him that can talk to me is mine, because he might just as well be talking to a dictaphone—oh—"

Well, I couldn't do anything other than comfort her, and for a little while she clung to me, sobbing fitfully. I don't remember clearly, but I must have whispered some mad thing. She broke away, drawing in a deep breath.

"I'm sorry, Charlie," she said, her voice very low. "You see, I still love him!"

I went in to see Alanson in a tight-lipped sort of way, but whatever I had wanted to say to him faded out of my mind when he turned his eyes on me. A powerful flame seemed to radiate from them, as though the brain behind emanated fire.

He was not at his desk, and had apparently been pacing the room.

"Charlie!" he cried huskily. "Charlie, I've made it! I can carry out ten operations at once—work my brain up to the last cell! And the mental power at my disposal amazes even me. Mathematics? At the snap of your fingers I can solve a calculus equation. Hypnotism? You, Charlie—take a bill out of your wallet and rip it in half!"

I had not been able to tear away from his terrible eyes, and now a vital force seemed to come out of them and make me reach for my inside pocket. A moment later I stared down, forlornly, at two torn halves of a ten-dollar bill on the floor.

"Thoughts are words to me," went on this amazing Alanson. "I can read your mind—like a book! In your brain I see—I see—"

Suddenly he stopped and some of the fire died in his eyes. I gulped, for my racing thoughts just a moment before had been pitying Jondra for being

married to such a mental monster. I waited for his explosion, but instead he dropped into a chair.

He raised a face on which I saw again that suggestion of strain I had noticed last time, but stronger now.

"Charlie," he said, "Jondra is living in hell. I offered her a divorce a few months ago, but the poor little fool refused—said she loved me!"

"She does," I seconded. "She chose you once, and she'd do it again."

A moment of silence, then:

"Something will have to be done about that. However, later. Let me tell you why I'm so—well, enthusiastic right now. Yesterday I brought my whole brain into the conscious state—eliminated the subconscious entirely. It was like crossing a brink, or reaching a goal. Something seemed to click in my mind, and I knew that from then on I wouldn't have to worry about keeping all the mental segments conscious. They are conscious to stay! Why that should be is a mystery."

EVEN to him . . . a curious thought. . . .

"Anyway, the mental capacity I now have is limitless! Instantaneous mathematical integration—hypnotic power—telepathy—yes, but more! What would be the next step of the super-mind?"

"Mind over matter?" I asked, ominously aware that he had put the thought in my mind.

"Ah—"

"Lanny!" I exclaimed, with a sudden fear icing along my spine. "It—it isn't right! Maybe it's meant to be the way it is—conscious and subconscious mind. Conscience—that comes from the subconscious, like a little voice deeply buried—guides us—keeps us from—"

Have you ever known someone, grave by nature, who seldom laughed, rarely smiled, and then seen that person burst out in Pagliacci cackling?

Alanson's laughter clipped off in midnote, but I saw that something inside him kept on, hysterically amused.

He jumped to his feet.

"Leave me now, Charlie. I have to think these *new* things—out!"

Well, I went—straight to Jondra and advised her, for reasons I couldn't explain, to leave the house for a few days, move to a hotel. I couldn't tell her something had crossed over from his mind to mine, as well as from mine to his, when he had read my thoughts. Something vague—terrible. . . .

But of course, Jondra refused.

That night I had a haunting dream in which I saw Alanson suddenly grow ten heads, each demon-eyed. I ran till breathless, then whirled, and the monster's tenth head, human and sad-faced, spoke hollowly—"I have the vision of the hydra! Yes, I have that—the vision of the hydra—"

I awoke, sweat-chilled, to find myself muttering that mumbo-jumbo.

TWO evenings later I was there again. He had phoned for me. First I saw Jondra, her face deeply sad. Then I glanced at Alanson and saw that the strain in his face had grown deeply. His face was flushed, dark shadows were under his eyes.

Jondra came over to me and deliberately put her arm around my shoulder.

"That's your answer?" queried Alanson. Jondra nodded and he looked at me. "There you are, Charlie. But you know that you can have her only at my will! If at any time I want to take her away—it would be simple. Even if you were at the ends of the earth—or the Universe! All I would have to do would be to concentrate—"

Jondra and I looked at each other helplessly. Alanson smiled, and for a moment the cloud over his somber face lifted. Then he told Jondra to go.

Alone with him, I faced Alanson with the feeling a mouse must have under the eyes of a cat. Those fiery flames in his eyes were brighter and more awesome.

"Charlie"—how strange the nickname sounded from his thin lips!—"hold a piece of paper between your thumb and index finger—here."

I took the sheet of paper, let it hang at arm's length. I wondered, and yet knew inwardly, what would happen. Suddenly, though there was not a breath of air in the room, the sheet vibrated rapidly. I dropped it with an exclamation and heard Alanson chuckle.

"Telekinesis—mind over matter," he

said. "You wonder how it is done. Well, think of a key that unlocks the door to an arsenal. The bearer of the key, however, does not light a match and blow the place, and himself, sky-high. He takes part of the gunpowder out for his use. Analogously, my ten-fold psychic force is the key to the arsenal of power within the atoms of matter. I release just enough to perform kinetic movement. Look—the vase!"

A vase of artificial flowers on a low-boy in the corner slid to the edge and landed on the floor with a crash. There was a distance of twenty feet between it and Alanson.

"Lanny!" I cried. "You're a humanitarian! You're not letting this strange power warp your judgment! You're going to write a book—teach others to use their full minds. You yourself are going to become a great scientist, doing good—"

I was trying to talk away that gleam of lurking menace in his eyes. He stopped me with a gesture.

"What, Charlie, is the next step!"

A whirl of thoughts churned my mind to formless chaos, but I didn't dare answer.

"What?—Rule the world?" He had read my mind apparently. "No," he went on, his voice strangely quiet. "No, not that. You misjudged me there. No—the next step is something far grander—astral projection of the mind! Projection of my mind out into space—to the moon, to Mars—to past and future even, for they are out there—to the hiding place of all the Universe's mysteries!"

"Impossible!" I gasped.

"Impossible is an expletive, not an adjective," returned Alanson. "Mentality is only one part of a brain's psychic forces. The power I have to release measured energies in the atoms, can be applied directly to projection of what we name mentality. Call it telementality—thinking from a distance, from *any* distance!"

"Madness!" I pleaded. "You're going too far, Lanny!"

HIS terrible eyes focused on mine, and I saw in their depths again that inner amusement, as though my thoughts were childishly naive.

"Fiddlesticks!" he said, contempt in his voice. "Now listen, Charlie, I'm going to project my mind out into space this very minute. I wanted you here to—well, I will have a body to which I must return, and your mind will be the anchor to pull me back. I can't explain, but—I may not come back!"

It is simple to tell of that incredible experiment. Alanson put me into a deep hypnotic sleep and when I came out of it, he was standing in front of me. I saw from my wrist-watch that a half hour had gone by.

It was a subdued, haggard Alanson that faced me. Even the fire in his eyes had burned away somewhat.

"Yes, I was out there," he said as I opened my mouth to ask. "Out in the frigid cosmos—out where there are only stars, drifting molecules, dark space stuff. I wandered for eternity over the desert of trackless sky. I saw the leering face of timelessness, the hideous form of immutable past-future. There was the inexorable loom which predestines all effort in any direction to endless repetition. The sheathed claws of the inevitable many-deaths reached for me, drew back mockingly. I reeled from the stark vision of futility, from the revelation of complete nothingness!"

He broke off, spoke next in a cracked voice—"But you wouldn't understand—you couldn't—"

The lurking terror had gone out of his eyes, but in its place was something infinitely more horrible. I can only describe it as a total lack of soul.

Vision of the hydra. . . .

The next evening Jondra met me at the door and quietly led me to Alanson's room, a queer look of peace in her eyes. But they were red-rimmed, I saw, from much weeping.

I looked in and saw Alanson seated at his horseshoe desk, with the phonograph voices droning away, himself writing rapidly at the pads of paper at either side. It was not until I leaned over him that I understood why Jondra turned away so pityingly. The pads of paper were scribbled with a senseless jumble of words. And a vapid face turned up to me grinningly. . . .

SPACEWARD

Engineers Can Shoot a Rocket to the Moon Today—at a Cost of $100,000,000! This Article Gives You the Latest Authoritative Data

By P. E. CLEATOR

Author of "Rockets Through Space," etc.

THAT the accomplishing of interplanetary travel will entail the overcoming of many formidable obstacles, none will deny—least of all the votaries of space travel. Indeed, those who believe in the ultimate conquest of space are usually far more cognizant of the difficulties concerned than those who so frequently condemn the enterprise merely because it has a superficial appearance of fantasy.

Until comparatively recently in the history of the interplanetary movement, the greatest of all obstacles was that of traction. And when Blaise Pascal, in the year 1647, demonstrated beyond all doubt that the earth's atmosphere did not extend throughout the whole of space, as was previously believed, it seemed that the position became well nigh hopeless. More than one eminent scientist, hitherto imbued with the idea of making a journey through space, pronounced the enterprise beyond hope of attainment when it was shown that there was demanded a method of propulsion effective in a vacuum.

About two hundred years after this set-back, Jules Verne proposed to overcome the difficulty simply by shooting a vessel moonward from a huge cannon sunk deep in the earth. It was soon realized, however, that the velocity of the projectile would need to be such that two disastrous consequences would almost immediately result: one, the passengers would be reduced to pulp by the terrific acceleration involved, and two, their remains would be cremated when the vessel, in shooting through the earth's atmosphere, was inevitably rendered incandescent by friction.

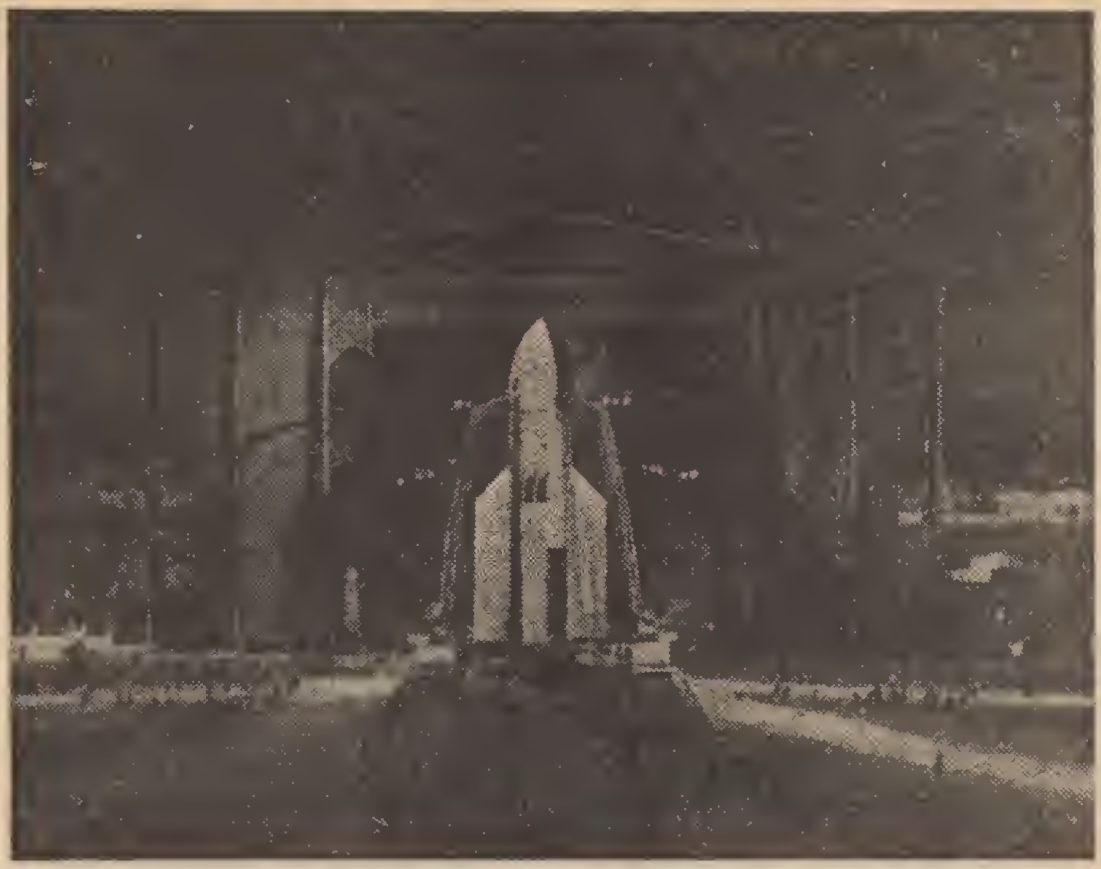
So, despite its ingenuity, its tempting simplicity, Verne's suggestion was regretfully, albeit firmly, abandoned.

Thereafter, the matter rested for half a century or more. Then came the realization that in the rocket, man had at his disposal a propulsive device which did not require the presence of air for its operation. In fact, a rocket would work better in the vacuum of space, for Newton's third law of motion—every force has an equal and opposite reaction—

Editor's Note: THRILLING WONDER STORIES is glad to present to its readers this interpretive article on the problems of interplanetary travels by P. E. Cleator, eminent student of rocketry and authority on astronavigation.

Mr. Cleator is the former president of the active British Interplanetary Society and is known in this country as the author of "Rockets Through Space," which is one of the most comprehensive recent works on the rocket as a means of space-travel.

In this important and timely article Mr. Cleator has considered the technicalities of the space rocket, as well as its immediate practicality. His conclusions are that if sufficient capital is available for building a rocket to travel into space, it will be possible now to build one!



Scene from the scientifilm, THE GIRL IN THE MOON, showing a rocket ship ready for launching

would operate best without the resistance of air. Today, with rocket experimentation proceeding apace in a dozen different countries or more, the rocket is everywhere recognized as being inseparably wedded to the idea of interplanetary travel.

There is, in fact, a widespread tendency to take it entirely for granted in this connection. Few appear to realize, indeed, (or else many choose to forget) that what was once the greatest of all the problems of space travel *has been solved!* Here, then, is the answer to those who maintain the fiction that interplanetary travel is surrounded by insuperable obstacles.

The problem which now heads the list is that of fuel, and as usual we are asked to believe that it is insoluble. But, as a matter of fact, a solution has already been found in the step-rocket! It is true that by this means the sending of a rocket to the moon, and back, weighing only twenty tons, and containing only four occupants, would entail the expenditure of no less than 35,100 tons of fuel. But the fact nevertheless remains that to anyone prepared to pay the cost — estimated at about $100,000,000—such a journey is not beyond the bounds of possibility today.

WHO would—or could—subscribe such a sum? I suggest the governments of the world. But might not the venture entail the making of several attempts, with every failure resulting in the loss of at least four lives, not to mention $100,000,000? Then it is an undertaking at which governments would excel, a project after their own hearts. Even as I write, in nearly every country of the world, they are embarking on just such a program of colossal expenditure. Not on spaceships, to be sure, but on battleships, and similar manifestations of our much-vaunted civilization.

I am sufficiently unpatriotic to suggest that the outcome will probably be

the needless wasting of far more lives and money than a dozen unsuccessful attempts to dispatch a spaceship to the moon would incur. But then I am a prejudiced rocketeer, to whom the conquest of space is inexplicably more important than the peculiarly terrestrial pursuit of shelling defenseless women and children from the safety of the decks of a modern warship.

Motor Assembly of Experimental Rocket No. 4 of the American Rocket Society

Let us console ourselves with the thought that the governmental preference for engines of pure destruction will probably not adversely affect the science of rocketry in the long run. On the contrary — always providing the world somehow manages to survive the next war-to-end-war—the ultimate effect will almost certainly be beneficial. For it cannot be claimed that the four-step moon rocket envisioned today, with its huge bulk weighing 40,960 tons, is in any way ideal.

I incline to the belief that if a lunar journey is ever attempted along such lines, it will only be as a last, despairing resource. As matters now are, with the question of cost prohibiting such an attempt, experimenters are stimulated to seek a better, and less expensive, solution to the fuel problem. And let it be said at once that there are numerous promising avenues of approach, many of which have as yet but barely been explored.

The most simple and direct method of solving the vital question of fuel would be by the discovery of more powerful agents. Today, the most powerful fuel available is a mixture of liquid oxygen and liquid hydrogen. But he would be rash indeed who maintained that there will not be discovered a more promising source of energy. Just as modern "high" explosives have largely displaced gunpowder, so some synthetic rocket fuel of the future may revolutionize our conception of what a powerful fuel is.

Perhaps the answer is to be found in the phenomenon of atomic disruption, which as yet we cannot in any way control, mockingly provided by radium and allied substances. Here is more than enough energy—if only we could learn the secret of how safely to release and use it.

THEN there are indirect, and less obvious, ways of attacking the problem. A most tantalizing part of the vexatious question of fuel is that even the comparatively weak fuels of today contain more than enough available energy to convey a spaceship to

the remotest of the planets, once the vessel is in space.

It is the ascent from, and the descent to, the planets which calls for a prohibitive amount of power. Thus there have been made many ingenious suggestions for giving the spaceship an initial impetus—from pushing it along rails, terminating in an upward slope, by a high-speed locomotive, to hurling it spaceward from a huge revolving wheel. It is to be feared, however, that the majority, if not all, of such suggestions involve enormous expense, and offer the saving of relatively little fuel.

Mention of a revolving wheel, however, reminds us that advantage can easily be taken of the centrifugal force of the earth's spinning by arranging for the spaceship to depart from the equator.

The possibility of neutralizing the earth's gravitational pull by giving the spaceship an electrical charge has been suggested. And, to make this inclusive, there is also the idea of constructing a station in space—an artificial, metallic moon, circling the earth at a height of 600 miles, specifically designed for the purpose of refueling spaceships.

By this means, a spaceship, departing with just sufficient fuel to carry it to the station from Earth, would be able to replenish its exhausted supplies, and then continue on its journey with the expenditure of relatively little fuel.

It may be, as some experts contend, that the achieving of interplanetary travel, even ultimately, will depend upon the construction of such a station.

The importance of the fuel question cannot be over-estimated. It is *the* problem of interplanetary travel today, around which nearly all other problems center. For instance, given an almost inexhaustible supply of easily controllable energy, the space ship, instead of being a ponderous, multi-step device, overloaded with fuel and costing millions of dollars, would become a vessel of almost any convenient size that we pleased.

And no longer would its equipment be limited to the barest necessities, and its passenger-carrying capacity confined to but four occupants.

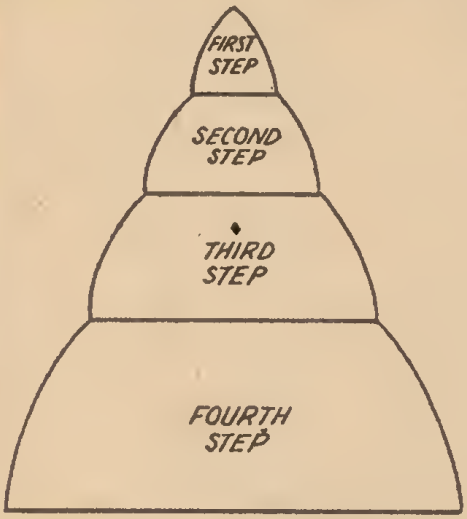
Again, with the fuels at present

Rocket perfected by Prof. Herbert Oberth, Repulsor type, descending after flight. Used liquid fuel

available, there is entailed the hazardous business of achieving an escape velocity of some 25,000 miles an hour when departing from Earth. Contrary to popular belief, the mere speed is of no consequence whatever, despite often expressed fears that the human system would mysteriously collapse when subjected to velocities of such an order.

ACTUALLY, we are even now shooting through space at more than 66,000 miles an hour, on account of the earth's orbital speed alone. It is not the speed, but the time taken to attain it—i. e., the rate of acceleration —which is of vital importance. The earth's speed, to all intents and purposes, is constant, and hence perfectly safe and (ordinarily) unnoticeable.

Now a space ship, of course, has first to attain speed. And the limitations of



NO. OF STEPS	WEIGHT IN TONS			TOTAL WEIGHT OF ROCKET
	LOAD	SHELL	FUEL	
1	10	10	60	80
2	80	80	480	640
3	640	640	3840	5120
4	5120	5120	30720	40960

In the step-rocket, when the fuel in the last chamber has been used, the entire compartment is cast off. Similarly, compartments 3 and 2 are cast off, and only compartment 1, containing the passengers, arrives at the moon

available fuels are such that the escape velocity of 25,000 miles an hour needs to be reached within an eight-minute period, which involves a rate of acceleration of at least 100 feet per second per second. German rocket experimenters early demonstrated that this requirement can be met: they subjected themselves to an acceleration of 160 feet per second per second for nine minutes.

Nevertheless, the first few minutes of an interplanetary voyage under such conditions hold promise of much acute discomfort for the occupants of the space ship. But with a sufficiently powerful fuel, the discomforts associated with the departure from Earth would vanish. For then a comparatively slow and therefore correspondingly safe and more comfortable ascent could be made.

In space itself, a super-abundance of power would increase the prospects of a successful journey in many ways. It would insure that the vessel could be adequately equipped with mechanisms designed to combat the extremes of temperature to be met in space. It would mean that the duration of the voyage could be decreased by virtue of the greater speeds that it would be possible to attain.

It would provide a simple means of overcoming the problem of weightlessness—by the maintaining of a moderate and steady rate of acceleration, thereby inducing an ever-present sensation of weight. And it would deprive navigation in space of the terrors associated with the possibility of losing one's course, and shooting helplessly onward for the want of extra fuel with which to direct the vessel toward its proper destination.

Almost without exception, therefore, the problems which hinder the achievement of interplanetary travel today are reduced to but one problem—that of fuel. But formidable though this key problem may at present appear, I consider that its ultimate solution is not merely possible: I believe it to be inevitable. Past history clearly shows that no matter how insoluble problems may have appeared in the past, unremitting labor and patient research have eventually triumphed.

I cannot conceive a single reason why the fuel problem which now faces interplanetary travel should prove an exception.

THERE remains to be considered, however, an obstacle to space travel which it is my humble opinion pro-

vides a greater problem than all the purely technical difficulties put together—man himself. Ever since *homo* so-called *sapiens* reluctantly descended from the arboreal haunts of his anthropoidal ancestors and contrived to conceal his Gothic nakedness beneath a cowhide he has bitterly resented and fought ferociously against every progressive move of any consequence.

Even the cowhide itself, I incline to believe, was a hated novelty strenuously opposed for whole geological epochs. Doubtless it was finally and sullenly adopted only as a last, despairing measure of defense against the unwelcome attention of horse-flies, an atrophied tail having proved lamentably incapable of combating the annoyance in the traditional manner employed by *Equus caballus* to this day.

And as with the cowhide, so with other innovations. The unknown genius who first conceived the revolutionary idea of the wheel probably suffered life banishment for his pains. The propounder of the hollowed-out canoe, as likely as not, met with a similar fate. And the neolithic nit-wit who invented the flint razor, and so set the world ashaving, I like to believe, was quietly strangled one dark night, and then drawn and quartered with the original implement of his misplaced genius.

But did not man, as generation succeeded generation, and as the cells of his cortex gradually proliferated—i. e., theoretically endowed him with the power to think—learn that new ideas were essential to his progress, that in original thought lay his only hope of avoiding stagnation — nay, atavism? Nothing of the kind. Nothing, indeed, of the sort.

With the passing of time, man not only remained incapable of assimilating new ideas: he redoubled his efforts to suppress them. And in the course of this laudable endeavor, he found a powerful ally in the supposed wrath of the gods.

I defy anyone to make an intelligent study of the history of discovery and invention and emerge from the ordeal other than a cynic, profoundly convinced of the crass and congenital stupidity of man. Right down to our much-vaunted and supposedly enlightened era of today, *homo asinus* has made what little progress he has, not because of, but despite, himself. Glance at the pages of the book of progress.

They are littered with those archaic words, "never" and "impossible." Range yourself on the side of a man who possessed an intellect so abnormal that he actually proposed a new idea of some merit, or dared to suggest an obvious method of improving an existing idea, and you will range yourself against almost the entire world and the whole hierarchy of heaven.

IT WAS not by accident, you may be sure, that nine million human beings were in the near past burned at the stake or roasted alive by the dozen in ovens for the mythical crime of witchcraft. Or that Robert and Charles, two of the first men ever to ascend in a balloon, were imprisoned at the instigation of the Church for supposedly desecrating the heavens.

Or that Giordano Bruno was fried alive at the stake for embracing the heresy that the earth moves. Or that the discoverer of chloroform, less than a hundred years ago, was denounced from the pulpit in thunderous terms for his impious efforts to alleviate the agony of childbirth. Similarly, it is no less accidental that the interplanetary idea is now a target for popular ridicule and abuse.

Yet the marvel remains that by the efforts of a few the many are unwillingly made a party to progress. Against his will, and despite all his antagonism, man has had forced upon him the aeroplane, the telephone, the motor car, and the locomotive.. Today, he has become reconciled to one and all these inventions of the Devil, and actually regards them with pride. Let us give man his due: he is unfailingly wise after the event.

And so it will be with interplanetary travel. Ridicule and abuse its votaries already face. Threats and efforts at suppression will surely follow, and may even for a time succeed. But providing man escapes the self-extermination he seems determined to effect, interplanetary travel will come.

RIFT IN

CHAPTER I

Night in Day

ON the rocky earth a faint but all-pervasive drone could be heard from the heavens. It seemed to fill the silent sky. Only after a search could the eye find the source, a tiny gleaming speck that rode the thin blue miles up, romantically buffeting the air currents born of the crags of the Rockies below.

From the ground a tiny, romantic speck. But from the air neither romantic nor tiny. For the droning speck was simply one of Pacific Airway's big new transport planes, the T-12, en route from Los Angeles to Salt Lake City.

A tri-motored monoplane, it was cruising easily at a hundred and ninety miles an hour, riding high and light, for it carried far less than its usual complement of passengers and baggage. Like a separate little world it drifted powerfully through the sky. And in that little world all was serene and nor-

A Complete Novelette of Absolute Space

Boehm yelled as he felt something invisible tugging at his ankle.

A Sudden Slip in the Cosmos Projects

INFINITY

By PAUL ERNST

Author of "The Microscopic Giants," "The Invincible Midge," etc.

Seven Humans into a World of Eternal Night

mal-seeming, with no faintest apprehension of dreadful danger to disturb the human cargo.

There was Richard Boehm, pilot, at the controls, lounging easily in the padded seat while the big plane practically flew itself. There was William Enright, co-pilot, younger, with radio ear-phones over his head, sitting beside him. At the moment the stewardess, Mildred Gray, was in with them.

Behind the glass partition separating pilots from the main part of the ship there were only four passengers: an elderly man named Fowler, who was a mathematics professor at Stanford; a fragile elderly woman, on the passenger list as Amelia Barlow; a powerfully built mining engineer whose name, Ludlow Gates, was known to every mining corporation; and Miss Rea Ray, one of the movies' minor though most beautiful stars.

Seven human beings riding behind sonorously beating propellers, peacefully and safely, high, high over the Rockies. Old Mrs. Barlow dozed a little, smiling in her nap as she thought of the pleasant reception she'd soon receive from her son in Salt Lake City. The professor looked absently down at the glory of the snow-covered mountains.

REA RAY gazed speculatively through the pilot's partition at the broad back of pilot Boehm. Ludlow Gates had a brief-case on his lap and was studying letters and contracts pertaining to a new borax find.

"Flying at seventeen thousand, Indian-Head bluff just ahead," co-pilot Enright spoke into the radio transmitter to the Los Angeles field far behind. He turned bright blue eyes up at Mildred Gray, who was tucking a strand of silky bronze hair under her stewardess' cap. He winked.

"How's the little brunette I saw you with last night, Herb?"

Back snapped the answer. "Are you thinking up vaudeville gags or flying a ship?"

"Both," said Enright. "Tell me, has the brunette got a sister?"

"No, she hasn't any sister. Weather ahead reported clear. Ceiling twenty thousand."

"Twenty thousand ought to be plenty. If she hasn't any sister, it's just too bad for you. I'll have to make a play for her myself. And of course, Herb, when it's a choice between you and me in a lady's heart—"

He stopped suddenly, and frowned at the transmitter.

"What's the matter?" asked Mildred Gray.

"Radio's gone dead," said Enright, shoving the ear-phones back from his head.

"Eh?" said Boehm sharply, straightening in his seat.

"Yeah," said Enright. "Herb's voice was coming through clear, with hardly any static. Then—zing! Dead."

"Probably just a loose connection," said Boehm. "Hunt for it, Bill—"

That was all he said. For at that moment the peaceful little man-made world became a small section of unadulterated hell.

The propellers screamed suddenly as though they had struck veil after veil of strong linen and were tearing a path through them. The plane tilted straight up, climbing for heaven, then sagged back on an uneven, sickening angle and began to toss like a chip in a whirlpool. At the same time everything went black, as though they had flown from the strong afternoon sunlight into a great black cave.

"Bill! Dick!" screamed the stewardess in the darkness. Her hands sought and found Enright's arm, and clung there as the plane pitched like a bronco in the screaming dark.

"Hang on!" That was Boehm's voice.

The shrieks of the movie star ripped from the passenger compartment, together with the strong, low cry of Gates, the engineer. But these sounds were muted by the scream of the motors.

"Power diving," Enright muttered, in the hell of movement and chaos. "Boehm—snap her head up—"

Before he could finish the sentence the shriek of the motors had become a normal roar again, and the pitching of the great plane had stopped.

But the blackness continued.

"My God, what's happened?" came Boehm's awed voice.

ENRIGHT'S hand was clutching Mildred's trembling ones. He was staring, stupefied, at stars outside like great gems set in pitch black velvet.

"Something's happened to the lights," he mumbled. "Turn 'em on—"

He stopped as he realized abruptly the stupidity of his words. The lights. Turn them on—

For they had been in broad daylight! It was the daylight itself that had suddenly failed, not man-made lights.

"The sun! Where's the sun?"

Then the cockpit lights snapped on. Boehm, reasoning mechanically as Enright had—darkness, turn on the lights—had snapped the switch. Then he, too, was bowled over with dazed comprehension.

"Where *is* the sun?"

The three stared out at the sky. A night sky, where the bright gold of afternoon had bathed them a moment before. A night sky? No. This was blacker than any night they had ever seen, with the stars more huge and brilliant.

And in strange positions, Boehm the navigator, suddenly perceived, with his brain beginning to reel a little. He had never seen constellations like this in the western hemisphere—or, indeed, any hemisphere, for that matter! New stars. Strange stars. Set in patterns such as no mortal eye had ever recorded before!

"My God—the altimeter!" gasped Enright.

Boehm's eyes snapped to it. A moment before, it had registered seventeen thousand feet. Now—it registered nothing! *Nothing at all!*

Both glared at the duplicate altimeter. It was the same. The needle was hugging the top peg. That result could only be achieved by a plane flying sixty or eighty thousand feet high.

Or higher!

The back door crashed open.

"What have you done with this plane?" came the wild, hysterical voice of the movie actress. In the lights of the cockpit her face showed like that of a terrified phantom—white and haggard and insane. "Take us down to the ground instantly! You hear?"

Boehm's reply was fashioned out of irony that only an instant later was realized as terrific truth.

"I'd love to, lady, but I don't know where ground is."

Mildred Gray gasped, and her fingers tightened on Enright's arm till they almost left bruises. Black night and great stars to the right and left of the plane. Black night and great stars above, as they could see when Boehm flipped inexplicably sluggish controls to see if by some chance they were flying upside down. Black night and great stars beneath them.

"Lord, it's cold," said Enright, numbly, hardly knowing what he was saying.

"Bill," came Mildred's thin voice. "Bill—do you find it hard to—breathe?"

Enright realized that he was finding it hard to breathe. He was panting a little, drawing in deep breaths, and being left unsatisfied by them. His heart was beginning to hammer a little.

THE T-12 was equipped with an oxygen tank for passengers whose frail health wouldn't take the altitudes the plane was capable of reaching. Boehm reached up and turned the tank on. In the pale electric light his eyes had a sort of glazed look.

"Better go back to the passengers, Bill. Take Miss Ray back with you—"

"It's so horribly cold," came Mildred's thin, frightened voice.

"You'd better go back with Bill, Mildred," said Boehm steadily. It was cold, and getting colder by the second. But beads of sweat glistened on his forehead.

Rea Ray had been whimpering and crying incoherently. She clutched at the co-pilot as he got up and walked toward her. Enright noted hazily that he moved with strange ease, as though he had lost many pounds' weight.

Boehm had snapped on the lights in the passenger compartment, too. Enright half carried the movie actress to the nearest seat. Then he and the stewardess turned to the rest.

Gates was shivering in his chair, but paying no attention to his tremors.

"What the devil's happened?" he snapped, staring first at Enright and then out at the impossible glory of the stars on their black velvet.

Old Mrs. Barlow said nothing. She had a fur coat clutched around her thin shoulders. Her hands were waxen with the cold. Her eyes glared emptily; she was frightened out of all remnant of sanity. Professor Fowler was staring out at the immeasurable blackness and biting his lips. As Mildred and Enright came toward him, he looked up at them with eyes that obviously did not see them. And if they had thought to see the last degree of fear and horror in the eyes of the rest, they were mistaken. The ultimate degree of horror was in Professor Fowler's eyes. Horror—and a dawning, eerie knowledge.

But the professor was keeping his profound fear under iron control.

"Have you any heating apparatus aboard?" he asked, grey face a composed mask in which his eyes swam in terror.

"Electric suits," said Enright, speaking dully. He was like a person who has been badly wounded, and for the moment feels only numb shock. It would be another few minutes before he could begin to grasp all this. "For high altitudes. Latest feature of Pacific Airways. Why?"

"Pass then around," said Fowler. "And now I want to talk to your pilot."

Mildred Gray went to the rear, gasping for breath, shuddering as though with palsy in the rapidly growing cold. She got out the electric suits, which plugged into sockets at each seat and received current from the rotating motors.

Enright went back to the pilot's compartment, moving with that strange lightness, while Fowler crowded on his heels.

The three stared at each other, white faces illuminated by the electric bulbs that made of the T-12 a tiny light-speck in the illimitable blackness. And in Boehm's eyes was the ultimate of horror, too, which answered the look in Fowler's eyes. He had had time to think while the other two left him at the controls.

At one moment flying along in bright afternoon sunlight, with the Rockies below—at the next riding in infinite night with nothing whatever showing beneath—

CHAPTER II

When Space Slipped

THE cabin thermometer registered thirty-four degrees below zero. Less than ten minutes ago it had been the normal seventy-two above. The altimeter still registered nothing at all.

The three stood in the suits through which laced tiny electric wires to keep them warm. In the passenger cabin, all were equipped with the suits, too. All save Mrs. Barlow. They could see Mildred, the stewardess, shaking the old lady, trying to get her into a suit.

In spite of the oxygen tank, the three were laboring for breath, panting and gasping, a little like occupants of a submarine when the air begins to give out.

"You know what has happened to us?" Fowler said to Boehm, quietly, iron self-control very much in evidence.

Boehm nodded just as quietly.

"I went up in a stratosphere balloon once. Eight thousand feet. At that height, when you looked up, the sky was black, just like this."

Enright listened, heart pounding with something more than lack of oxygen. He sensed dimly what was coming. Nevertheless, he could hardly repress a cry when it came.

"Somehow," said Boehm, still with that unnatural calm, "we've been thrown clear out of Earth's atmosphere and into—space."

"Exactly," said Fowler.

Enright stared, then gasped.

"But look here! That's mad! It's impossible. In three minutes we were tossed clear of the whole planet? So far we can't even see it beneath us? We'd have had to travel faster than light!"

"I have an idea," said Fowler heav-

ily, "that the speed of light is a pitifully slow pace compared to ours."

"It's impossible, I tell you! Earth must be near!"

"Find it," said Boehm, staring ahead at a great, bright constellation that looked like a jewelled dagger hung point down in darkness.

"But—"

"There is no Earth. There is no Sun. There are no constellations as we learned them in navigation school—not even a Milky Way."

Enright was biting his lips. He was a hand-picked young man; all Pacific Airways' pilots are; but he was only twenty-four.

"You're trying to tell me that in three or four minutes we left Earth so far behind that even the aspect of the heavens has changed?"

"No," said Boehm, "we couldn't have. But it seems—" He turned to Fowler. "You have some idea about this, sir?"

"I have," Fowler said. "It's a theory that sounds like something you might hear in a lunatic asylum. Yet to my mind it's the only one that can explain what has occurred. It is, briefly, that space has slipped, and we are at its end."

There was silence broken only by the strangely distant sounding purr of the propellers. The thermometer registered forty-six below.

"Space — has slipped?" repeated Boehm, almost in a whisper.

"Yes. I'll try to explain it."

FOWLER regarded him steadily.

"Einstein's theory is that space is curved. Very well, if it is curved then, at long last, through the Universe, it must return to whatever spot in it has been chosen as the starting point. Just as, on a ball-like Earth, if you start walking straight ahead you will eventually return, after twenty-five thousand miles, to your point of departure. Following that simile, if you face east and take one step forward, you have moved three feet. If you take one step backward, you have, in a sense, moved twenty-five thousand miles, for it is that distance eastward from the point where you stood to the point you moved back to."

"I—don't understand—"

"You will, I think. Though no one of us can ever really grasp it. Terms like infinity and endless space are utterly incomprehensible to finite minds. Now what I think has happened is this:

"Assuming that space extends infinitely in all directions from Earth, at some point past infinity it must end at Earth, too. So, carrying out the stepping-backward-on-Earth simile, if our plane moved backward a mighty step in space, we might find ourselves at space's very end, just as a backward step on our planet would figuratively carry us twenty-five thousand miles. However, the plane made no such move. Drifting at the comparatively non-existent speed of about two hundred miles an hour, it was suddenly catapulted into the end of space. Therefore, the only possible answer is that the end of space moved to envelope the plane instead of the other way 'round. Space slipped, in a word. It warped, buckled, so that the far-end telescoped over the near-end sufficiently to engulf us."

Boehm moistened his lips. And his lips cracked without his realizing it. It was now seventy-one degrees below zero in the pilot's cabin.

"There's no sense to it."

"It's a sense beyond our comprehension," said Fowler.

"If space is endless, how can it have an end?"

"The end is beyond endlessness."

"How can it extend *through* infinity? There is no boundary to infinity."

"Even infinity has infinite bounds."

"If endless space curves endlessly to come back to its starting point through infinity," said Boehm, "why can't you see both ends of it instead of only the beginning end? Why, back on Earth, couldn't we see that dagger-shaped constellation that lies dead ahead of us?" He pointed out the front.

"Because space *is* endless," Fowler pointed out patiently. "In any direction you look, you gaze along the beginning of space, for millions of light years, as far as a telescope will carry you, but can't come within a trillionth of reaching the end of that space—which is right behind you."

Boehm slowly shook his head. And Enright felt an insane desire to laugh. Small beads fell from the pilot's forehead with the move. Beads of sweat, frozen and dropping off. It looked very odd.

•

AT the same time Enright knew there were frozen beads like that on his own face.

"Maybe you're right, Professor. Yes, I guess you must be. Space has slipped, and we're at the end of it instead of the beginning—though it has no end."

"Long way from home," muttered Enright, struggling with the crazy desire to laugh. There was too much oxygen in the thin air, from the oxygen tank. He felt weak, and drunk.

"We couldn't be longer," said Fowler. "Because of that warping of space, Earth is, well, infinity away."

"And," said Boehm steadily, "in the T-12, an ordinary transport plane not even constructed for stratosphere heights, we are flying at a snail's pace in the endlessness of outer space."

"Correct. A glance outside confirms that."

"But absolute zero exists in space," said Enright, gaining a little against the gay madness that whirled in his weakly drunken brain.

Fowler pointed mutely to the thermometer. It stood at seventy-seven below.

"These ships are tightly built," muttered Boehm, "but naturally they won't begin to keep out such cold. Four hundred and sixty degrees below our normal zero—and the air!" He turned suddenly toward Fowler. "There's no air in stellar space. And this ship is far indeed from being hermetically sealed."

Fowler nodded grimly.

"With every passing second, more of our air is streaming out from around cracks of windows and doors and into the emptiness around us."

The professor drew a deep breath. It was a breath of utter hopelessness, revealing now the source of his self-control. He had known from the first what the others were just comprehending, and the knowledge had given him the calmness of utter despair.

"In this frail plane we float in space so i m m e n s e that great suns are drowned in sheer distance. It will get colder and colder, till we freeze into ice blocks. But long before that, the oxygen from your tank will be exhausted, and the pressure inside the plane will drain out until we explode internally like over-inflated balloons. Gentlemen, ours is the most bizarre death humans have ever suffered. But it is death, just the same. Inevitable—and very quick."

"I don't know about that," Enright heard himself say suddenly.

Fowler turned to him.

"I mean, about this being the first time men have died this way. In the history of Pacific Airways, two planes have left airports, and never been seen nor heard of again. Just—disappeared."

"Right!" exclaimed Boehm, cracked lips slack. "Perhaps this slipping of space has occurred before. I wonder—"

The door opened suddenly. Mildred appeared in the doorway. A white patch in her cheek told of frostbite. But she was obviously too shaken to feel it.

"Mrs. Barlow is dead," she said. "Her heart, I think. I'd just got a suit on her, and was warming her, when I felt her slump backward. I suppose the thin air—"

Fowler shrugged.

"I think she's the luckiest of the lot of us," he said softly.

"What?" Mildred's eyes went toward his.

Enright took her hand, in its bulky mitten. Those electrically heated suits had been put in the cabin really as an advertising point. "Pacific Airways the last word in luxury. Even equips its passengers against the cold of high cruising altitudes. No other service has this feature—" That sort of thing. What would the advertising manager think if he could see the use to which his debated suits were being put now?

"Listen, kid, can you take it?" Enright said to Mildred.

Her white face turned toward his, with the dead white patch in her cheek

slowly growing.

"What do you mean?"

"This is curtains for all of us," Enright said, quietly. "No use going into crazy details. We're going to die, that's all. No air, and freezing to death at four hundred and sixty below zero."

"Ought to tell the rest," said Boehm thickly.

He and Fowler went through the doorway into the bigger cabin behind them. Enright paused beside Mildred.

"Want me to stay here with you, kid?" he said.

The stewardess stared at him.

"No, Bill. I'll be—all right. I'll stay here alone, though. Kind of think it over."

On a sudden impulse, Enright bent down. His freezing lips touched hers. Then he joined the other two in the cabin.

CHAPTER III

Absolute Space

REA RAY'S hysterics had disappeared. The superficial frivolities had slipped from a very lovely and very spoiled young lady; and now, quietly, she listened with the rest to Fowler's theory of the dreadful thing that had occurred. Pilot Boehm's eyes were on her in admiration, and his hand opened quickly to engulf hers reassuringly as she moved nearer to him in her seat.

"—and so," Fowler concluded, "that's our situation, and our doom. We are trapped here in absolute space."

"Nonsense," said Ludlow Gates.

"Eh?" Fowler looked puzzled, and the others turned quickly toward him. They were all clutched by the fear that goes beyond despair and ends in resignation. There seemed to be no fear in the engineer's voice. Only irascibility.

"I said nonsense! Absolute space indeed!"

"But my dear sir—you have only to look at the sky—"

"Rot! I'm no professor of higher mathematics, nor yet am I a pilot. I'm just a mining engineer. But I can use my head, I hope."

They stared at him, with something like gratitude in their faces. His irritability, seeming unmixed with even a trace of fear, was like a bracing tonic to them.

"The cold in absolute space is 460.66 degrees below zero, Fahrenheit. This plane cabin is a thin metal shell. Do you think it would continue to be something less than a hundred below in here if it were absolute zero outside? Again, do you think the motors would keep on turning at that temperature?"

"But—" said Fowler.

"Shut up. Absolute space! There's no atmosphere in absolute space. Yet there seems to be enough atmosphere outside to give your motors combustion, with their super-chargers. And there seems to be enough atmosphere to let the pilot maneuver the plane with rudder and ailerons. There must be *some* air, or other gas with a similar oxygen content, outside."

Gates moved his big shoulders irritably.

"Again, in space there is no gravitational force. We'd be floating around in the cabin like corks if we were in utter space. And we're not. Our bodies have at least some weight."

Fowler shook his head. Some of his terror had been absorbed by the sheer, inhuman scientific interest that no man of science ever quite loses, regardless of the surroundings.

"Do you realize what you're doing? You're predicating the existence of a planet nearby. That would be the only thing that would account for the conditions you seem to think—"

"Seem to think?" rasped Gates. "Would gasoline motors, even air-cooled, function in absolute zero? Would our air stay in here, even with the oxygen tank on, for a minute?"

"But there can't be a planet. If there were, we'd have been falling toward it from the instant we struck that buckling in space."

"How do you know we're not falling now?"

"But you can't see a planet anywhere!"

"How do you know our eyes function

right in this part of the sky—wherever the hell we are? Maybe materials and light beams are different."

The door to the pilot's compartment opened. Mildred came in. She sat beside Enright.

"I don't suppose it means anything," she said dully, "but it's got a little warmer. Sixty-eight below, now."

GATES stared at Fowler, almost with a sneer.

"Well, can the temperature of absolute space vary like that? Isn't that against all the theories you chair-warmers have ever evolved?"

Fowler was biting his lips. And then Boehm exclaimed suddenly. He had been staring unseeingly ahead, out the front window of the plane and at the dagger-shaped constellation. His hand tightened on Rea Ray's till she cried out a little.

"Look!" Boehm said hoarsely, pointing at that constellation.

The others stared quickly. And they saw a curious thing.

The star forming the tip of the dagger was blotted out. Then it showed clear again, and finally was blotted out once more. The second time, the star above it was cut off, eclipsed from their vision, too.

"There's something in the sky out there! Something dead ahead, that's between us and that constellation!"

"There can't be anybody out there," protested Fowler, wrinkling his forehead like a bewildered child. "If there were, a small planet or asteroid, it would shine, at least a little, in reflected starlight."

"Yeah?" said Gates unpleasantly. "Didn't you ever see materials that didn't reflect light? I have."

"You haven't. The dullest of materials reflect at least a little light!"

"All right," snorted Gates, "there's nothing ahead of us, then. It's only our imaginations."

Boehm was continuing to glare ahead. Nearly all of the dagger-shaped diagram of stars was shut off from them, now. And he could see, against a background of other, fainter stars, segments of a great curve.

The thin hum of the motors was gradually becoming more full-bodied, indicating a thickening atmosphere of some sort outside. A huge, full circle of the sky before them was a circle of blackness, with no stars showing. It was as though a great plate were being held up before the T-12.

Only you couldn't see the plate. The sole indication of its existence was that you could see nothing on the other side.

"There *is* a planet there," said Boehm. He looked around at the others' white faces. "Now what?"

Rea Ray spoke. "Land on it."

"Land on it?"

Gates nodded.

"That's the only sense I've heard here so far. Sure—go down to it. You can't float around here forever, can you?"

"But God knows what may be down there! We may not be able to breathe the atmosphere. There may be dangerous life. The planet may be like the moon—full of hundred-mile-deep craters we'd fall into—"

"All right," snapped Gates, "soar up here till you run out of gas and crash anyway. For that thing has gravity force. Already we weigh more. There's enough gravity pull to smash us as thoroughly as if we crashed from a hundred miles up on Earth."

Boehm said nothing to that. There was nothing to say.

AFTER a moment he got up and went to the plane's controls. Enright and Mildred followed him, and, in a little while, Rea Ray. Behind them, Fowler and Gates argued—Fowler earnestly and hopelessly, Gates exhibiting only impatience and annoyance.

"He's one cold proposition," said Enright, staring at the big, stolid engineer. "I don't think he's got a nerve in his body."

"He's the bravest man I've ever seen," Boehm said in a voice that was not quite steady. "I've heard of men who really had no fear whatever of death. I'd never thought to see one. But *he's* like that."

The round black hole in the star-studded sky was growing rapidly more all-engulfing, indicating that, whatever celestial body it was they approached,

it was quite small. A large sphere could have been glimpsed at a distance it might have taken weeks to traverse. Or centuries.

"But there can't be a planet!" said Enright. "So close to Earth! It would have made its presence felt in all sorts of ways. High tides and things."

"It isn't close to Earth," sighed Boehm. "It's at the opposite end of space from Earth."

"But space hasn't any end. How can a thing without end have an end?"

"Stop it," said Mildred. "Look. The thermometer."

It was comparatively warm in the cabin: only fifty-two below. And it was perceptibly easier to breathe. Economically, Boehm reached and turned off the oxygen tank; but a moment showed that they were not entirely independent of that, after all; so he turned it back on, at a low rate of issuance.

Fowler's voice came to them.

"It's impossible. Empty as space is, the chances are billions to one that we couldn't be thrust into it at random, and happen to land near one of the rare celestial bodies."

"All right," rasped Gates. "It's billions to one that a planet like Earth should develop atmospheric and other conditions that would make that rare thing, life, possible. Yet it did so develop them. Which means that your billion-to-one shots do turn out sometimes."

"I wish," said Boehm, "that the professor would turn his brain away from the impossibility of a planet—which we all know is just under us—to the problem of what it might be like."

All the sky ahead of them—or under them, if one would choose to state it that way—was now a black and starless void. But still the blackness looked more like a hole than a solid.

"Maybe the thing's like a big cup, and we're going down into it," said Enright dubiously.

"Hardly," said Boehm. "Any substance turning free in space is bound to assume a spherical shape."

"We don't know that. It's only a theory—"

"Men are funny," said Mildred, with a catch in her throat that she turned into a shaky little laugh. "With sure death ahead of us, you can argue about the shape of the thing we're going to die on."

"Better to argue than go nuts," said Enright.

"Oh, I didn't say men were foolish. I just said they were funny—"

"Look at the altimeter!" said Enright suddenly.

THEY stared. It registered fifty-five thousand feet.

Boehm levelled the plane out with a jerk that even in that thin atmosphere caused a sickening lurch.

"Lord, we're going fast! I don't think I can set her down at the landing speed we'll have to take in this air."

"It will be all right if we can find a long enough flat space," said Mildred.

"You find it, will you?" said Boehm. The three stared out—down now, instead of ahead, since he had straightened the T-12 out of what had become a meteorlike power dive. Then they looked at each other.

"You can't see a thing. Not one damn thing. The ball might be as smooth as a marble—or cut up with cliffs and chasms like a big waffle-iron. We'll have to squat at random, that's all."

Mildred's hand was trembling on Enright's shoulder.

"You know how much chance you'd have of avoiding a crackup if you came blindly down on Earth at random!"

"We can only hope that this is more level than Earth," said Boehm.

He tilted the nose down. And then there was no more talk. He snapped out the lights and peered ahead, hoping that thus he could see more. But there was still nothing to see. Nothing! The altimeter registered ten thousand feet. And they knew it was right. They could, curiously, *feel* the great mass beneath them. But all they could do was feel it. They could no more glimpse it than you can glimpse black velvet in a black room.

The altimeter gave them six thousand feet, then four, then one.

"Tell 'em to hang on back there," said Boehm, after moistening his cracked lips.

Mildred went back. Enright saw her

lips move, through the glass partition, and saw her sit down and grasp the padded chair-arms.

Five hundred feet. Two hundred. By a sort of instinct, Boehm cut the motors. A wheel scraped, jarring the plane badly. And then they landed, with a crash that would have torn the T-12 to pieces had it weighed its normal amount instead of perhaps a quarter of its Earth weight.

Boehm braked, but the plane seemed to run on endlessly. They bit their lips, whispered curses that were like prayers, and waited to smash against an obstruction or careen into a bottomless pit. But neither happened. The plane dipped and rose as if rolling over the swells of a petrified ocean, and finally stopped, intact.

"The motors!" Gates' rasping voice sounded. "Don't stop 'em. We might not be able to start 'em again in this cold. And we need the generators for juice for these suits."

Boehm cut the motors to their slowest idling speed, and moistened dry, cold-split lips.

"Well," he said, "we're here. Wherever the hell here is."

"Wonder if there are any borax deposits in this place?" came Gates' calm, dry voice.

CHAPTER IV

The Eyes Outside

OUTSIDE, it was fifty-two below, according to the thermometer. Or a very little colder. The men were out on the wing, and the temperature felt about the same. For the moment they were cut off from the warming current generated by the slowly turning motors; but they could take the cold for a little while. The worst trouble was breathing. They had barely been able to gulp enough air in the cabin, with the aid of the oxygen tank. Out here each breath of rarefied atmosphere was an agony. But they could take that, too, for a short time.

The landing lights were all on, streaming downward. And the result was fantastic. Immediately under the plane the light stopped, as light does when it hits an opaque object. Yet they could not see what substance it was that stopped it. It was as though the plane rested on dull black glass, which reflected no pinpoint of light, and into which the eye could penetrate until vision was lost in nothingness.

There was the plane, bathed in illumination. There were the solid-looking beams from the floodlights, like short legs on which the T-12 rested. And then there was nothing.

"The planet's invisible," said Enright.

"No," said Fowler. "If it were invisible, we could see through it, see the stars on the other side. The substance of which it is composed is completely nonreflecting, that's all."

"I don't know that it makes any difference," said Boehm dully. "We can't live here. The thin air and the cold make that impossible, even assuming there was some sort of food to gather or water to drink. We're no better off than we were up there." He waved toward the thin, cold glory of space.

"At least we can live longer," protested Enright. "We can live on for hours after the gas gives out, before we're frozen to death. It's warmer down here, and—"

"And what?" said Gates irritably as Enright stopped.

The younger pilot was facing away from the cabin, looking into blackness along the huge wing. He spoke without turning his head.

"I'm going crazy, I guess."

"None of us are completely rational at the moment, I'd say," Gates snapped dryly. "But what is your particular form of lunacy?"

"I thought I saw something move out there."

"What!"

The others crowded close. Then Gates said: "How could you see something move, when there's nothing whatever visible in this cursed place? What did you think you saw?"

"Eyes," said Enright, still staring. "Or a pair of light patches in the blackness that reminded me of eyes, anyway."

"If there were anything to move here," Fowler said didactically, "it would hardly have eyes. They're of no use when there's nothing to see."

"It is barely possible," Gates retorted, "that another kind of eye might see things here where ours can't. I see no reason why——"

"Look! There they are! Eyes! I *did* see them!"

The men stared over the wing. Boehm exclaimed; the rest were silent.

Out in that impenetrable blackness two dim patches were faintly to be seen. They looked like circles of dark grey paper held out there, perfectly round, about a foot apart, and perhaps half that in diameter.

THEY foreshortened from circles to narrow ellipses, as if whatever head they might be set in had turned sideward. Then they disappeared.

The men looked at each other. By common consent they moved back toward the door of the plane's cabin.

"Life here," whispered Boehm.

"Something moving, at any rate," said Gates calmly.

"Dangerous?" wondered Enright.

Gates shrugged. "There's no way to tell. If those eyes were set in the kind of head in which eyes usually occur on Earth, they indicate a very large animal, from their size and their distance apart. But they may be set in antennae, and belong to quite a small, and harmless, creature."

"There's one way to find out," said Enright, with a sound coming from his lips that was meant to be a laugh, and turned into something far different.

"Don't be a fool," snapped Gates, clutching his arm as he moved out along the wing. "Why throw your life away before death is necessary?"

"It may be something we can use for food—" Enright began, a bit wildly.

"Or it may be something that will use us for food! Look."

Gates' voice didn't change a bit from its dry ill-humor. But a subtle extra resonance or something in it made the other three turn quickly.

There was the pair of eyes again, seeming nearer now. And now they were not alone.

Here and there, dotting the blackness, with no sound of movement accompanying their appearance, were other dim grey circles. In pairs. Always in pairs. And almost unvarying in their height from the unseen surface of the substance composing this small planet: about five feet.

"There are dozens of them," said Boehm tensely. "I wonder what the devil they are?"

He peered at the sky, trying to catch outlines of the eye-bearers against the stars. But the stars weren't studded thickly enough for that. Here and there, against a cluster, he could catch a short glimpse of a curve that might have been back or head of one of the things. But that was all.

Then the plane moved suddenly. Not very much. It tilted a half inch, and tilted back again. But it distinctly had moved. And under the end of the wing they stood on, the men could see several of the dim eyes, much nearer than the rest. They could hardly see these because the light from the plane, at that point, seemed to wash them out rather than make them clearer.

Light pouring out there, and revealing nothing at all. And the plane moved a second time, more perceptibly.

Then Boehm yelled hoarsely. The fabric around his right ankle constricted as though a serpent had coiled there, and he started to slide over the edge of the wing, fighting desperately to draw back.

Gates was first to grab him. The others caught him too, and pulled him back, breaking at last a strong, sluggish pressure that tugged against them.

"Into the plane," snapped Boehm, gasping and staggering. "Whatever those things are—they're big—and they're hostile—"

MOVING as fast as they could, starved for air as they were, they scrambled back into the all-metal cabin. Rea Ray and Mildred stared at their white faces, and their wide eyes. Rea voiced the intuition of both the girls.

"Oh! There's something — dangerous—out there—"

It was Enright's impulse to lie, even

though the lie was obviously foolish: even as he sought for words the plane was lifted a little and thumped down again. But Gates was evidently a believer in letting ladies as well as men face facts.

"There is," he said, as though less moved by the danger than annoyed by the nuisance of it all, "something pretty dangerous. We don't know what it is—or they are—though. We can't see 'em!"

"Bill—" cried Mildred in a thin, frantic tone.

For the plane had tilted as though banking for a turn, and only very slowly settled back again. The things outside were investigating it with blind power, stupid or intelligent, fumbling for the food within the metal or methodically preparing to break the confining cabin to pieces; there was no way of telling.

"Let's get away from here," panted Rea Ray. "We'll be killed here. Take us up. Quickly!"

"But—" began Boehm, hopelessly, shoulders drooping.

"Again, she's the only one around here talking sense," grated Gates. "Up we go."

"I don't think there's a chance in a million of getting up," replied Boehm. "I'll have to have a ten-mile run to get us up in this thin atmosphere. Ten miles—over a surface we can't even see! Lord knows what we'll crash into in that distance."

"Would you prefer just to stay here while those things outside break the plane apart and kill us, young man?" rasped Gates, staring.

Boehm shrugged, and went forward. Enright started to follow, then stayed behind. He could do no good in the pilot's compartment. If there was any conceivable way of lifting the T-12 off this surface, Boehm would find it. He was one of the best flyers in the United States.

And that raised an odd echo in his brain, numbed as it was by disaster so bizarre that he couldn't even comprehend it. The United States! Where would that microscopic atom in space be from here?

He heard the motors roar up as Boehm gave them the gun. They stuttered a little. They had cooled dangerously in the terrific cold even though they had been idling all the time. Then their song became smoother, and rose to a roar.

The plane lurched a little, started forward. The port motor stammered, started again. Enright went to Boehm's side.

"The prop hit something," Boehm said, through clenched teeth. "One of the Things outside, I guess. They couldn't be too solid, or the prop would have shivered. Though the thing that grabbed my leg seemed solid."

The T-12 was rolling rapidly now, up and down, as if over long, ocean swells, but striking no spot too rough to ride over. It slowed spasmodically, started once more. The two pilots stared at each other. Had they plowed into a group of the Things? There was no way of telling, any more than there was a way of telling *what* the Things were.

CHAPTER V

Sunlight

THE motors were racing at top speed. The plane must be ripping at a terrific pace over the unseen surface they were trying to leave. But, save for the pitching motion and the bumps they struck now and then, they could not tell that they were moving; there was no object outside to watch flash by as a gauge of their speed.

The bumps eased, resumed, as the plane took off for an instant and then

slumped back. Enright and Boehm were staring straight ahead, unwinkingly, ready for the grinding roar of a

crack-up. And then the bumps stopped permanently. Boehm dared ease back a little farther on the controls. The T-12 slanted up a little farther.

They were off the surface, and safe —unless there were such things as hills and mountains here.

"So what?" said Enright, not realizing that he had spoken aloud. "Where do we go from here?"

Boehm said nothing. He kept hauling the plane up at as steep a slant as it would take in the thin gas outside. The glory of the stellar space grew slowly again.

And Gates came into the compartment. He looked like a man who had got clear downtown from a commuter's station and suddenly discovered that he has left his wallet, watch and business notes behind.

"Of all the stupidity," he fumed. "Why couldn't one of us have thought of it before? At least it gives us a goal to shoot at, instead of simply mooning around out here in space."

"What goal?" said Boehm. "What are you talking about?"

"That young moving picture girl suggested it. Quite sensible, though I'd never have believed it before."

"Said what? For God's sake, if you have any suggestion—"

"I have. A good one. Why shouldn't we try to get back the same way we left?"

The two pilots gaped at the engineer.

"We got here through traversing some fault, or slippage, of space," Gates said impatiently. "Well, why don't we try to get back by recrossing the same crack, or whatever it is."

Still the two said nothing. Then Boehm, scowling, said: "How do you expect to find the spot? And what chance is there that the fault in space still exists?"

"We can at least see if it exists," snapped Gates. "As for finding it, you're supposed to be a navigator, aren't you? Didn't you place any of the constellations after we'd got in strange sky?"

Boehm shook his head, then straightened.

"Yes! I did! That dagger-shaped one—we flew straight toward it—"

"Then," interrupted Gates phlegmatically, "suppose you try flying straight away from it for as long as the gas holds."

He went back to the other compartment. Boehm shook his head.

"Absolutely fearless! He's a man, Bill! And of course he's right. Our best bet is to try to retrace our course, even though that's impossible."

The tip of the dagger-shaped constellation showed clear. Boehm set a course that put the dagger squarely on the T-12's tail.

"Take the controls, will you, Bill?"

ENRIGHT nodded. He alone knew the terrible tenseness that had gripped Boehm during that strange, blind takeoff; and knew the exhaustion that must grip him now.

Boehm went back to the passenger compartment. Mildred went front to be with Enright. Boehm sat beside Rea Ray, whose hand went toward his.

Fowler was covering a page with mathematical symbols.

"What the devil are you doing now?" Gates jerked out.

"Figuring the plane's chances of pulling away from the planet's gravitational force," said Fowler. "It can't be done. I can prove mathematically that we'll never win clear."

"I should think that the fact that a plane can leave ground at all, where the pull is strongest, would prove that it could keep on going up as long as its fuel supply held out and there was atmosphere thick enough to hold it," growled Gates. "But then I'm no higher mathematician."

Fowler put away the paper.

"Even if we could escape the planet's pull," he said, with complete hopelessness in his eyes, "we could never strike that warping of space again. No doubt it was instantaneous, and has straightened out long since."

"Why is there no doubt about it?" retorted Gates. "When an earthquake opens a crack in the earth, that crack may last for days, or forever."

"Are you presuming to compare Earth, substance, with the intangible, space?"

"Oh, go to sleep," grunted Gates.

BOEHM pressed Rea's hand.

"A great guy, isn't he? I never knew a man could be as brave as Gates. I'm in a blue sweat. I admit it. But Gates acts like a man who is annoyed because his paper hasn't been delivered on time—and that's all."

He stopped, realizing that Gates' final retort had not been purely rhetorical. He was very sleepy, and he saw that the rest were too. The thin air, robbing them of vitality; the intense cold, combatted by the electric suits; the terrific and exhausting nerve shock all had sustained—these things were mounting in overpowering drowsiness.

That was all he knew. He sank into sleep—dangerous in that awful cold—so profound that it was as though he had been hit on the head. Sleep that lasted till a scream from up in front split his slumber.

He jerked broad awake. The scream came again. From Mildred, up with Enright. He heard her words this time, but they made no sense for an instant. Then, as they penetrated understanding, he shouted hoarsely and got to his feet.

"Sunlight!" Mildred was screaming.

Boehm smashed back in the aisle, and grasped an upright as, suddenly, the plane tossed like a rowboat in a typhoon. Up, up, till it hung by its nose, down again in a dizzy swirl, around and around like a leaf in a gale.

And then the T-12 purred on an even keel again. And it was bathed in the liquid gold of sunshine, while far under it was the green Earth.

Boehm got up and stumbled forward, muttering something, he didn't know what. Mildred was sobbing and shivering. Enright sat bolt upright in his seat, with glazed eyes looking down at a large town. The altimeter said thirty-nine thousand feet.

"We're home," came Enright's strained, high voice. There was blood on his chin where he had bitten almost through his lip.

The radio ear-phones caught Enright's eye.

"See where we are. That town looks familiar but I can't place it."

He picked up the phones, hearing the door behind him open as he did so.

"T-12. T-12. Calling T-12."

"Okay," Enright said, in the strange, shrill voice.

"Bill? What the hell happened? I couldn't get you for a few minutes."

"You couldn't—*what?* For how long?"

"A couple of minutes. Or, I don't know, maybe it was only one minute. Seemed longer. Did your radio go on the blink?"

Enright moistened his lips. He couldn't seem to find any words. He recognized the town below them, now. It was Tia Juana.

"Did you hit some kind of electrical storm?" persisted Herb. "A couple of the mechanics here say they thought they saw a black streak straight up, but can't be sure because it seemed to flick across the sky so fast. Like a big crack, or fault."

What was to be said? Enright didn't know. He took refuge in a lesser report for the moment. He didn't want to seem insane.

"Look, Herb. Bad news at this end. One of our passengers, an old lady, just died of heart failure. I'll talk to you later."

Boehm and Gates came in. There was irony on Gates' face.

"If you can find a way to report this without having us all put in an asylum, young man, you're good."

Boehm turned to the engineer. There was reverence in his eyes.

"May I express my admiration of you, sir? I'd never have believed there existed a man who really didn't know fear, if I hadn't seen one. You! It was entirely due to your unbelievable fearlessness that we pulled out of this. Now that it is all over—Mr. Gates! What's wrong?"

For suddenly Gates was reeling. His face was literally blue, and his eyes were like empty holes. He was, in a word, the most horribly frightened person Boehm or Enright had ever seen.

"All over . . ." the engineer chattered. "Oh, my God . . . don't have to pretend any more . . . all over now.

"Gates—" exclaimed Boehm, reaching for him.

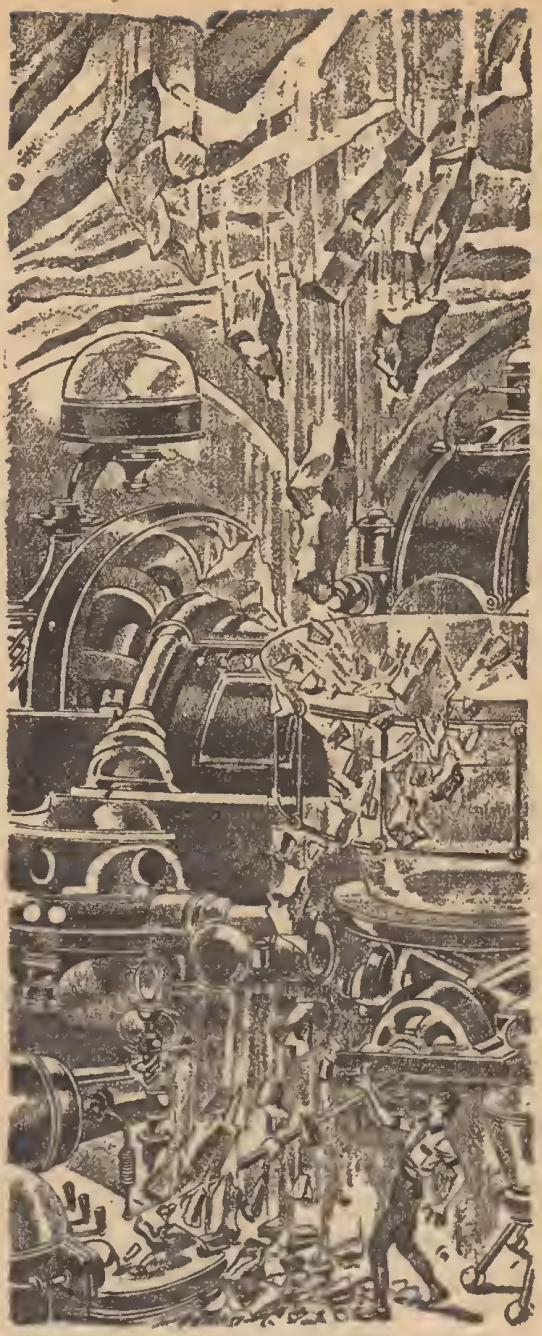
But Ludlow Gates had fainted.

The SOLAR Menace

A Criminal Scientist Plots to Destroy The World by Means of The Sun's Energy!

By S. K. BERNFELD

Author of "Bent Light," "The Slow Vacuum," etc.



It was too late.

HIGH in the stratosphere, Melas Radok piloted his little stratocar. His bulbous forehead and satanic eyebrows shaded a pair of baleful eyes. A cruel, thin-lipped smile on his face, he thought of the escape he had just made from the International prison on Earth. They had thought they could hold him in bondage—the fools! They had called him a menace to society, an arch-criminal to be eliminated.

But there would be no trial for him now. Friends had smuggled some *euthanil* to him in prison. Radok had discovered this potent sleep-producing powder and he alone, in all the world, had its antidote coursing through his veins. One spray of this drug in the air and his guards fell into a coma while he, protected by the antidote, was able to walk safely to the rocket-ship waiting for him, that meant freedom.

With the click of a switch, he set the stratocar's audio-vision set on. A fluorescent picture slowly appeared; color-vision apparatus was still too elaborate for rocket-ships—and the image of the Planetary Police Patrol captain faded into view.

The executive was addressing a world-wide audience. Already they were broadcasting news of his escape, that he was to be hunted down, instantly ray-beamed.

Radok smiled complacently to himself. Let them try and find his hiding-place. He set the ship's controls at

maximum, and the craft sped through the rarefied air in a direction due south.

In a cavern hollowed out beneath fathomless tons of ice, at the south magnetic pole, was hidden Radok's secret workshop. Built by men he had later killed, the place was unknown to anyone but him. It was stocked with technical resources for the production of any instruments he desired. Food and air supply were more than ample.

Mankind was a disease. A cancer of the earth. And he, Radok, was determined to cauterize the festering mass. They had outcast him. Well, he'd show them.

And so alone, in his cavern at the south magnetic pole, Radok ruminated on the punishment he would inflict. It would not take long to perfect the needed machinery.

He was going to destroy Earth and humanity by fire. He knew that, with the exception of radioactive energy, the heat of the earth was derived from the glowing ball of the sun. The sun, though only a minor star in the cosmos, was nevertheless able to pour forth titanic quantities of energy in the form of radiation which was dispersed in all directions. And the earth, a mere pinpoint in space, ninety-two million miles away, was able to absorb but a minute portion of this output. But this small fraction of the sun's heat was enough to warm it.

All about the planet and its air envelope was empty space. Here the inconceivably greater portion of the sun's radiation was directed, to travel on and on for many years, perhaps in the end to be charted as a star in the heavens by the denizens on some foreign planet of a distant galaxy.

Radok's scheme was to make use of this immense sum of energy that the sun was radiating all about Earth. He planned his huge solar condensers so that the earth would attract more than its normal share of the sun's rays. The greatly increased amount of heat the earth would receive would parch and wither all the land. So Radok intended to revenge himself upon society.

SITUATED as he was, at the south magnetic pole, Radok was able to draw upon the immense magnetic forces of the earth. Magnetism, in its natural state, affects only a few metals, notably iron. But Radok, with his knowledge of its relations with light energy, knew how to alter its properties. Tapping this force at one of its foci, the South Pole, he directed it through his mighty apparatus, subtly converting it into another type of energy. This had the property of attracting light. As Radok's machines began to function, this new magnetism was sprayed into the air to form a nimbus around the earth, to draw the light as it was poured forth in tremendous quantities from the sun.

It had been winter when Radok had escaped from his prison in the North, and so the South Pole was in the long day of summer. Safely concealed under the ice-cap, and far from civilization's outposts, for long hours every day he listened tensely to the radio, hearing the world-wide weather reports, his face aflame with hate and fury.

As the solitary days passed, Radok grew careless of his appearance and it was a grotesque figure of a man that sat by the receiving set chuckling often in a weird falsetto. Already the weather bureaus in the North had become perturbed at the mysteriously daily rising temperatures and consequent drouth. In the cities gigantic cooling systems tried to neutralize the heat.

Meteorologists all over the world were frantic. There was much talk of sun-spot cycles, and of the aurora borealis. Ten scientists brought forth ten different theories about the weather. They declared, for the most part, that the heat was temporary, not really dangerous. It would eventually go away like all heat-waves.

And through it all, Radok sat in his cavern, his frame shaking in silent mirth. It was just beginning. When the seas begin to boil, and the very air scorched the lungs, would they still say, "not dangerous?"

He even gave up listening to the radio reports as he spent weeks tending only to his machines, while his brain was obsessed with the thoughts of re-

venge that seethed in it.

At length, in an ironic mood, he decided to listen again to some news of the world so that he might hear the sufferings and lamentations of mankind. He pressed a button that controlled the weather-report frequencies and prepared himself to listen to the grief-stricken voice of a speaker.

"It is glad tidings that we bring you today, our friends," a joyful voice came through. "The spell of terrific heat that has greatly disturbed our world appears to be broken. From all over the world, scientists have sent in confirming reports—"

Radok, startled, jumped up incredulously from his chair. Had his machines stopped? He dashed over to them, but they were still operating, emitting the force that drew the heat to the earth. Was it possible that his calculations were wrong? But what, then, of the previous reports he had heard of intense heat? Again he turned his ear to the voice coming from the instrument.

"An ample supply of the much needed rain is here and the crop yield this year promises to be the greatest in history. Further reports have come in that the winter in the north temperate zone will be warm enough for an additional harvest while tropical temperatures appear, at the same time, to be down to comfortable levels—"

With an angry snarl, Radok turned off the voice. What madness possessed Earth's scientists? How dared their opinions go against his knowledge? And yet, the thought began to dawn that there *was* a possibility that they were right and he, wrong.

Could it mean that somehow he had been benefiting mankind instead of punishing them? As this realization occurred, an ominous sound rang through the cavern.

Above him, he could hear a crackling noise as countless crystals of ice rubbed over each other. The sound grew louder and louder, but its meaning was lost in the feverish tracts of Radok's obsessed mind.

FOR a moment or two he paced the floor of the cavern in his agony of mind, heedless of everything. But a constant lightly drifting stream of needlelike particles that persisted in falling upon him impressed itself finally upon his consciousness. He recognized them for what they were, sharp bits of ice from the ice-cap above him. Startled, he looked up, and on the roof of his cavern he saw grim, greenish cracks which were widening visibly, slowly yawning.

An awareness of what it meant burst upon the frightened man and he looked wildly about for cover. It was too late. The imponderable mass of ice above was breaking up, something he had never expected. With a loud clap, the roof of the cavern fell in. Radok was instantly crushed beneath tons of rending, burying ice.

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THE AUDIO-VISION NEWS

Printed in Your Audio-Set Ten Times Daily
Subscription 17 Currency Units Per Annum
Jan. 12, 2093
Edition 9:20 A. M. (G. M. T.)

Word has been received from the Hubert Timkins Expedition at Antarctica of the discovery of a huge cavern beneath the polar ice-cap. In it was the body of a man, crushed beneath fallen ice. It has been positively identified as the body of Radok, the scientist-criminal who mysteriously escaped imprisonment six years ago.

Within the cavern were also many huge machines, which the expedition's scientists are busily studying. It is believed at Antarctica that these machines have some connection with the intense heat-spell that was felt all over the world soon after Radok's escape.

From a cursory examination, it has been determined that the machines were of a magnetic nature capable of handling intense quantities of force. While their use has not yet been completely discovered, the expedition has at least found out that they attracted the sun's light to the earth, in tremendously concentrated quantities. This is evidently what brought the heat about.

But this additional heat, of its own accord, cooled the earth, thus forestalling Radok's plans. The heat due to his engines was first felt at the equator, diminishing greatly as one approached the polar regions. Therefore the normal difference in temperature between the poles and the equator became greatly increased. This made for additional intensity in the force of the winds, since they are only convection currents.

Due to this increased windiness and a higher temperature on the earth's surface, the process of evaporation of water from the ocean and the waters of the earth was enor-

mously accelerated. An immense bank of clouds was established all around the earth, which effectively reflected back all the increased radiation that was coming to the earth.

Thus, the temperature at the earth's surface was decidedly lowered soon after the onset of the heat and, in addition, the protective cloud-bank tempered the winter and provided beneficent amounts of rain.

Radok's death was due to a fault in the layer of ice above him. When the warm spell came, the ice melted slightly. But when the cooler temperatures were re-established, the ice-cap developed a fault in its structure when re-freezing. This, the Timkins Expedition has established, was the one cause of Radok's death, a death which he brought upon himself just as effectively as if he had committed suicide.

THE WEINBAUM MEMORIAL VOLUME

DAWN OF FLAME and other stories by Stanley G. Weinbaum. Published privately by Conrad H. Rupert. $2.50.

THIS volume, the long and anxiously awaited Weinbaum Memorial Volume, contains seven of Stanley Weinbaum's best stories, including four of his "weird animal" stories: "The Mad Moon," "A Martian Odyssey," "The Lotus Eaters," and "The Red Peril." Also, "The Worlds of If," from the rib-splitting van Manderpootz series, "The Adaptive Ultimate," which was published under the pseudonym of John Jessel, and finally, the previously unpublished long novelette "Dawn of Flame."

Since most of the readers of this review have read the previously published stories, comment on them would be superfluous and praise presumptuous. Some who knew Weinbaum said that in a short time, had he lived, he would have taken his place in the top flight of science fiction writers. Those critics are in error. From the moment that "A Martian Odyssey" was published, Stanley Weinbaum was not only a member of the top flight, but was, perhaps, in a class by himself. His writing was smooth, concise, and literate, combining plausibility, humor, imagination, and an inimitable literary style.

"Dawn of Flame" will be a surprise to the vast majority of Weinbaum's admirers.

"It is, briefly, a story of the interregnum, about 2200-2300 AD, when our present western civilization has broken down and the new world civilization is developing. It has much in common with John Collier's "Full Circle" and with H. G. Wells' "Things to Come," but its style and theme are distinctively Weinbaum's. It is a greater literary achievement than all of his more conventional stories together, and earns for him the right to be included in the ranks of the great story tellers of all time—that glorious army that ranges from Homer and Scheherazade and Rabelais to Mark Twain and Kipling and Ambrose Bierce.

Stanley Weinbaum died just as he was getting into his full stride as a writer. But he left a few precious tales behind him, and those tales will not be "interred with his bones." They live, and will live.—J. D. C.

SCIENTIFILM REVIEW

THE ETERNAL MASK. Produced in Berne, Switzerland. Director: Warner Hochbaum. Cast: Mathias Wieman, Olga Tschechowa, Peter Petersen, Tom Kraa. German dialogue; full English titles. From the book of the same name.

AT the close of the World War Europe produced "The Cabinet of Dr. Caligari," a film in which the audience shared the viewpoint of the insane protagonist. Now, nearly twenty years later, comes "The Eternal Mask," an interesting and well-staged photoplay dealing with the phenomenon of split personality. Far from being a dull treatise, it is an exciting and dramatic story of a doctor who believes himself guilty of murder, and whose mind crumbles beneath the strain.

From the first moment when Dr. DuMartin turns from his dying patient to whisper to a colleague, "Why are you staring at me?" interest mounts steadily to a striking climax. Scientifically sound and powerfully dramatic is the sequence in which DuMartin comes to believe that his reflection in a stream is himself; bizarre and haunting is the grotesque dream-world through which DuMartin wanders, seeking the other DuMartin whom he believes has killed his patient. Intelligently scored music adds to the effectiveness of these fantastic scenes.

Underplayed notably by Mathias Wieman as Dr. DuMartin, the film offers interesting comparison to Hollywood's "Private Worlds." Similar are the sequences in which disembodied voices whisper to the victim. But "Private Worlds" did not attempt to show the objective dream-world of the subject, and there "The Eternal Mask" excels. Watch for the angle shots of the descending elevator, and the climactic scene between DuMartin and his dream-self— "the man with a mask on his face." Don't be frightened away by the German dialogue, for the English sub-titles are less silly than most of their kind. This Swiss production is worth a dozen like "Things to Come"!—H. K.

Coming Soon: A Special Article on Rockets by WILLY LEY

Science Questions and Answers

THIS department is conducted for the benefit of readers who have pertinent queries on modern scientific facts. As space is limited, we cannot undertake to answer more than three questions for each letter. The flood of correspondence received makes it impractical, also, to promise an immediate answer in every case. However, questions of general interest will receive careful attention.

NEBULAE

Editor, Science Questions and Answers:

I am not quite clear as to what nebulae are. I've heard them described as "gaseous" and as composed of groups of stars. Are there different kinds of nebulae?

E. W.
Evanston, Ill.

There are three distinct type of nebulae, which word is Latin for "mist" or "cloud": the so-called planetary nebula which consists of a single star surronnded by an atmosphere as mnch as 10,000 times larger than our sun; the well-known ring nebula in Lyra is an example. All planetary nebulae exist within our own galaxy.

The nebulae of the second type, called galactic nebnlae, consist of tremendous regions of lnminous gases surrounding entire groups of stars. These gases are extremely tenuous, more so than our best man-made "vacuums." They also exist within our galaxy.

The planetary nebula gives off hundreds of times the light that our sun does. The galactic nebula shines hundreds of thousands of times brighter. But now we come to the extra-galactic nebula which radiate millions of times the light a single sun does.

These "nebulae" are different, and are actually island universes, separated from onr galaxy by vast gulfs of empty space. Yet in our telescopes they appear as the same tufts of fuzzy light as our own nebulae. They are clouds, it is true, bnt of stars instead of wispy gases. Within them are the planetary nebulae and galactic nebulae that we have, but no telescope is able to search them out over that tremendous distance. The largest telescope in the world, the 100-inch reflcctor at Mt. Wilson, is barely able to make out the brightest of their separate suns. This telescope has caught the image of an island universe 140 million light-years away, observing it now as it was 140 million years ago when only primitive forms of life ruled Earth. Some two million of these island universes have been recorded.

A tentative pictnre has been painted of the cosmos, and the nebulae are a vital part of it. In some inconceivable past all space may have been filled with a uniform whirl of atoms and molecnles. Gradually condensation occnrred. Each separate patch became a galaxy, or island nniverse. In each separate patch, ours for instance, other patches separated out and condensed finally to snns. The galactic nebulae of the second class represent a halfway stage. The planetary nebulao represent a further stage. All other stars represent the final stage.

With this hypothesis is the theory of the expanding Universe. The farther an island universe is from us, the faster it is moving away from ns. As we measure the velocities of extra-galactic systems from telescopic limits inward, the speeds diminish, as though we are nearly the center of a macrocosmic explosion. Yet rather than an explosion, it is supposed to be an expansion of space itself, carrying its bits of matter with it. Fanciful as it sounds, there is some significant secret contained in this amazing theory of star-masses rushing away from a common center. —Ed.

TELEPATHY

Editor, Science Questions and Answers:

Telepathy pops up in science fiction quite often, like a bad penny. What I'd like to know is if there is anything to it scientifically. And just WHAT is it supposed to be?

B. D.,
Boston, Mass.

Telepathy means, literally, "feeling at a distance." Translating a little more freely —"thinking at a distance or to a distance."

At present telepathy and ghosts are about in the same class, from the scientific point of view. Except for certain as yet unsubstantiated tests (Columbia University and Sir Oliver Lodge) this mental phenomenon is not admitted to exist. Yet we mnst remember that science did not admit of Clerk-Maxwell's long-range waves till Hertz and Marconi came along, to usher in radio. Nor in transmutation till radioactivity was discovcred. Science cannot acknowledge the existence of a phenomenon until it is logically proven to exist. And as yet telepathy has little solid proof behind it, though there is a growing tendency to speak of it less sarcastically and skeptically than formerly.

The most scientific theory of telepathy is that minds reach out and touch one another through some medium, either the electromagnetic ether, or some ntterly nnknown corridor. The agent of communication is supposed to be some manner of wave. Telepathy is supposed to be an added sense. Sight is possible throngh light waves. Hearing is possible through sound waves. Supersensual thought transmission might therefore be an-

other type of wave, though no such wave has been recorded. All other theories of telepathy resolve mainly into the spiritual and supernatural and have given it its black eye because of this undeserved association.—Ed.

SUNSPOTS AND THE WEATHER

Editor, Science Questions and Answers:

Is it true that sunspots affect Earth's weather? Just what are the sunspots?

J. D. C.,
Scranton, Pa.

Sunspots undoubtedly do have an appreciable effect on Earth's weather, but to what extent has not yet been catalogued. It is known that magnetic storms, the aurora borealis, and the variations of Earth's huge magnetic field are directly influenced by the sunspots.

These mysterious areas of violent distnrbance on the sun's surface, the result of interior conditions, vary in size from 500 to 50,000 miles. The larger ones would easily engulf a dozen spheres the size of Earth. They are very short-lived. One-fourth of all the sunspots ever recorded lasted less than one day. Some few last for a month or so. They are as independent in motion as bits of cork on a stormy sea, and often wander thousands of miles from their original position. They are obviously storm-centers which beat thier way over the sun's surface, much as cyclones and tornadoes do here in Earth's atmosphere.

Althongh the sunspots appear dark, in fact black, against the general surface, they are in reality still brighter than any known luminescence on Earth. They are dark on the sun only in contrast to the sun's inconceivably brilliant atmosphere of gaseous metals.

One of the most interesting phases of the sunspots is their periodicity. Every eleven years they reach a maximum of number and size, when sometimes a hundred are visible at once. At the minimum of their period, one may not be seen for months. No reasonable explanation has been found for this as yet.

Historically, the sunspots were noted in ancient times by the Chinese. But in modern scientific times, they were first noted by the amazed Galileo with his first telescope, with which instrument he had already discovered Jupiter's moons and Saturn's Rings, and the starry composition of the Milky Way.

The sunspots have been a favorite study of astronomers since that time and a great mass of data have been recorded on them, yet their ultimate mystery is unsolved—as to what causes them in that great, flaming ball of superheated matter which gives life and light to Earth.—Ed.

NATURE'S PROBLEMS

Editor, Science Questions and Answers:

Can you answer these natural history questions? Are animals color-blind? Why do salmon snap at lures during their fresh-water spawning period, when they are not supposed to eat? Why are spiders not snared on their own webs? Why does heather grow on the barren moors? Why does a bat sometimes tumble in mid-air? Why are earthworms?

F. A.,
Glendale, Calif.

Natural history is replete with riddles that can sometimes be answered only by logic. Most animals are color-blind to blues and greens, but not to reds and yellows. It is said that hens, if given a mixture of yellow and blue grains, will eat the former first, then peck slowly at the latter.

In common with certain other forms of life, salmon have their nutritive and reproductive periods sharply separated, the former in salt water, the latter in fresh. Yet it would be unreasonable to assume that the spawning salmon, confronted with what seems to be a juicy fly or minnow, will totally ignore it. It can do without food at this time, bent on more serious business, but is not lacking in its normal appetite.

The spider's web, so sticky and fatal to flies and other victims, does not trap the weaver himself because the microscopic hairs on his legs are oiled, protecting him from the viscid secretion on the strands of the web. Naturalists have observed the spidor spreading this oily protection over its body so that it will be free to dance nimbly over the web that traps its victims.

Heather grows in those barren moors where few other plants can live because of a symbiosis—mutual benefits between two separate forms of life—between itself and a certain fungus. This partnership, at the slight expense of some of the heather's sap, furnishes it with the all important nitrogen, which the barren soil lacks.

If a bat has caught a rather large insect in mid-air, and must give it a second bite which will end its struggles, it is confronted with the problem of opening its mouth and losing the insect, or of having a third agency stuff it in further. This third agency is its own wing, with which it pokes the insect further into its mouth. While it uses the wing, it cannot flap it, and as a result dips in the air in characteristic bat fashion, only to recover in a split second and go on in search of more food.

It is a good thing that earthworms are! There are 50,000 individual worms per acre of arable ground. In a year's time these 50,000 pass ten tons of soil through their alimentary systems, making it fertile. They remake the surface at the rate of three inches in fifteen years. Without this incredibly numerous horde of indefatigable soil rejuvenators, which exist almost all over Earth's surface, plant life would wither to a wretched minimum.—Ed.

WEIGHT OF THE EARTH

Editor, Science Questions and Answers:

Several times I have heard, or read that the weight of Earth is a certain amount. Will you please tell me by what this is

reckoned? Whenever we weigh anything it is measured by the amount of attraction by the earth's gravity, but naturally the earth itself cannot be used when determining its weight. Please explain.

R. A. S.
Glendale, Calif.

Strictly speaking, the Earth has no **weight**, since it is a free body in space, but it has **mass**. Its mass is represented by the number 6 followed by twenty-one ciphers, which equals six thousand millions of millions of millions of tons. The simplified mathematical expression is 6 times 10.21 tons.

Now to conceive of how this so-called mass is reckoned, we must differentiate between **mass** and **weight**. Mass represents the **quantity** of matter, based on large units of the standard proton particle. That is, a portion of matter of any sort from hydrogen to uranium possesses an invariable mass in proportion to the number of protons that compose it. This is irregardless of the amount of pressure or amount of gravitation to which it is subjected. It is the **number** of protons which we are measuring when we measure mass, and thus it is the **quantity** of matter. It is standard all over the Universe, so far as we know.

Weight is a specialized measurement. It is the amount of attraction exerted on any object in a standard gravitational field. On Earth's surface, at sea level, mass and weight are identical. Or rather, weight has been standardized to equal mass. But if we take a cube of iron to the North Pole its weight changes, becomes smaller. Yet its **mass** is unaltered. A cube of iron would weigh much more on the sun than here, yet its **mass** would be the same.

Now in measuring the mass (erroneously called the **weight**) of the earth, we use the inflexible laws of gravitational attraction between heavenly bodies. Gravitation is a direct product of mass. Thus the amount of gravitational effect the Earth exerts on the Moon is a direct measure of its mass. The term 6,000,000,000,000,000,000,000 tons as Earth's mass means that if Earth were cut up gradually into little pieces and all weighed separately at sea level, their grand total would be that many tons. For our mass units and weight units are equal at Earth's sea level. Yet if these earth pieces were all weighed on Jupiter's surface, the grand total would be two and a half times more. For the weight units at Jupiter's sea level, if any, do not coincide with the standard mass units.

Therefore, it is a figurative expression to say Earth **weighs** so many millions of tons, but it is actual fact when we say the same of its mass, of the **quantity** of matter in it. —Ed.

PROTOPLASM AS AN EXPLOSIVE

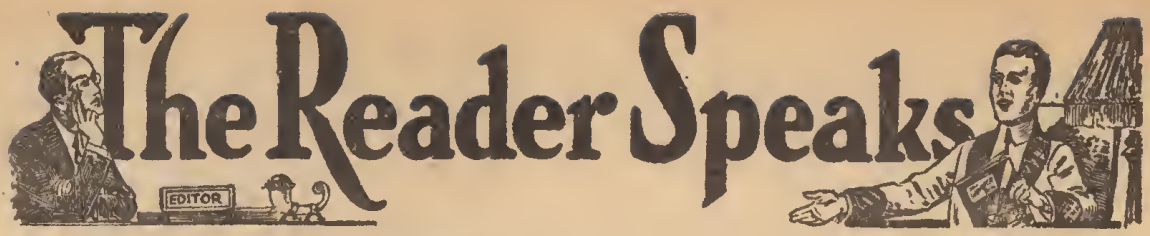
Editor, Science Questions and Answers: Somewhere I have seen the statement that protoplasm is an explosive. Is this true, and if so in what form?

L. E.,
Englewood, N. J.

You have probably seen a table of comparisons between protoplasm and nitro-explosives. They are remarkably analogous. Both are made up chemically of a nitrogen group with a carbon compound. Both may be detonated. Protoplasm's detonation is exhibited in the reflex action of muscles, of working body cells, of thinking brains. Somewhere within the cell nitro-carbon compounds "explode" with all the force and energy of a similar quantity of nitroglycerine. Both protoplasm and nitro-explosives have a high speed of oxidation. Both give off the same waste products—carbon dioxide, nitrogen, and water. Both produce short-wave radiation. In living matter this is the energy that runs through our nervous systems. Both react to stimuli of light, sound and electric charge. Our eyes see only because some sensitive nitro-compound decomposes (explodes) when struck by light. We hear through the agency of nitro-molecules that transfer energy to our brain. Electric shocks make our muscles "kick" quite as readily as TNT kicks or explodes.

Nitro-explosives, of course, are much simpler in structure than the nitro-compounds in our flesh, yet they behave in much the same way, showing that our life processes are more in the nature of a continuous series of tiny explosions within our body cells than a steady burning of carbon to carbon dioxide. This viewpoint also accounts very readily for those times when we react to instinct, with a rapidity that is astonishing. When we jerk our finger from a flame, strike blindly at a foe, leap back from a danger, bear up under a sudden physical strain, or shout loudly, something in our bodies is waiting, ready at split-second notice to supply huge quantities of energy, when we suddenly need them. This is more closely analogous to the release of explosive energy than to any other chemical reaction in the laboratory. And of course the chemical relationship is still more obvious, atom for atom.

Thus our protoplasm may be described, quite credibly, as a storehouse of nitro-explosives, but with no danger of all of it going off at once, as with the true nitro-explosives. —Ed.



IN this department we shall publish your opinions every month. After all, this is YOUR magazine, and it is edited for YOU. If a story in THRILLING WONDER STORIES fails to click with you, it is up to you to let us know about it. We welcome your letters whether they are complimentary or critical—or contain good old fashioned brickbats! Write regularly! As many of your letters as possible will be printed below. We cannot undertake to enter into private correspondence.

LIKES 'EM EASY TO READ

By C. C. Wilhelm

Thank heaven for a story like "Green Hell," by A. K. Barnes. I'm just an ordinary guy who likes his adventure with a scientific tinge, and most of the high-powered stuff about ultra-dimensional worlds and etheric stases leaves me baffled and disappointed.

"Green Hell," now, the average reader can understand without constant references to a 6-foot shelf of science books. I'm all for more stories on that general order. It's no masterpiece, but it moves right along with several clever little scientific twists to give it the right atmosphere.—1009 Brand, Glendale, California.

(Thanks for the kind words. Another Venusian tale by Mr. Barnes next month—this time a novelette!—Ed.)

BRAVO FOR BINDER

By Elmer Hansen

Congratulations on a swell June issue! "Chessboard of Mars" was easily outstanding. Eando Binder has a knack that lets him get as fantastic as he wishes, but never becomes ridiculous. I always look forward to his original and workmanlike stories.

The best of the short stories were "Black Vortex" by the ingenious Mr. Long, and "Green Hell," by Arthur K. Barnes. I always did like Mr. Barnes' work, because he is fluent and generally has characters a reader can believe in as flesh and blood. I hoped he wasn't kidding when he hinted there's another Venus story in the offing, about Venusian fauna. I'd like to read some more along those lines, especially about those fascinating "whiz-bangs!"

Personally, I don't care for "Zarnak" or the Swap Column. But if enough readers like 'em, they don't waste enough space to make me stir up a big fuss about it. 90% of the magazine suits me fine. I wish I could make other investments that yielded such returns!—911 N. Arden, Beverly Hills, Calif.

IS OUR FACE RUD!

By James Wray

In this, my first letter to you, let me say that I enjoy the type of stories in T.W.S. Let us have more of the theoretical type. "Menace From the Microcosm" was very good; also the others. Let me put in a plea for greater accuracy in stories. Nothing spoils an otherwise good story more, in my estimation, than do statements which are entirely contrary to the fundamental laws of physics and astrophysics. No matter to what state of progress man may evolve to, I feel that these fundamental laws can never be altered.

Take some examples from the June issue. "The Molten Bullet," by Anthony B. Rud. First, the author says, "Polyphemus had a kink in its tail." I always understood that the tail of a comet streamed directly away from the sun, and not behind the comet, like the smoke from a tracer bullet. Second: "No one could suspect that it was because the asteroid-comet was a mass of highly magnetic iron, attracted to the earth's iron core!" How could the earth affect the asteroid-comet when it was in the vicinity of Uranus?

Third: Due to gravitational attraction, "It would probably reach the awesome velocity of 5000 miles per second." If an object were to fall from an infinite distance to the earth, with the sun directly behind the earth, adding its maximum amount of attraction, the object could not strike with a velocity greater than 27 miles per second. With an initial velocity of 55 miles per second (as given to Polyphemus), it could not strike the earth at a speed greater than 61.3 miles per second.

Fourth: "That final night the entire heaven was filled from horizon to horizon—" and "two more hours, and Polyphemus hits the outer rim of the earth's atmosphere!"

Two hours is 7200 seconds. At a speed of 61 miles per second, its distance would be over 500,000 miles. At the speed of 5000 miles per second, its distance would be 36,000,000 miles. If Polyphemus were as large as the earth (very unlikely, because it had only 1/12 the mass), at a distance of 500,000 miles, its diameter would subtend an arc of less than one degree!—Division 2, U.S.S. Memphis, San Diego, Calif.

(Thanks for pointing out these astronomical inconsistencies. Mr. Rud, the author, wishes to remind Mr. Wray that the Martian language is a bit ambiguous, which is perhaps

why he may have slipped a couple of degrees in translating their message.—Ed.)

AN ALL-STAR ISSUE

By John V. Baltadonis

The cover for the June issue is undoubtedly the best so far. The artist is certainly improving in his cover work. "IF!" is much better than Zarnak. I look forward to the next in the series.

It's a pretty hard job to pick the best story in the issue. It seems to be a mighty close race between "The Chessboard of Mars," "Green Hell," and "Menace From the Microcosm."

Another improvement in this issue is the introduction of Wesso to your readers. I liked his illustrations immensely. I hope that his drawings in the next issue are equally as good, or better still.

This is undoubtedly the best issue you've put out yet—the stories are all of high rating, the illustrations are better—even "Zarnak" is better this time.

The line-up for the next issue looks swell—all of which makes me plead all the more for T. W. S. to be published monthly.—1700 Frankford Ave., Philadelphia, Penna.

NO SERIALS WANTED

By Richard Scott

Upon finishing my fourth issue of your magazine, I am glad to say I have enjoyed every one of them. I think "If" is very good and is very well drawn. Hold on to Binder—he's a good artist! Among the best stories in the June issue are "The Dark Sun," "Menace From the Microcosm," and especially "Darcondra."

There has been much discussion lately about printing serials but, I think, a large amount of your mag's popularity is due to publishing all complete stories—so steer clear of serials!—Rolling Rd. Golf Club, Cantonsville, Maryland.

BINDER TOPS

By Roy A. Squires II

Waiving all preliminaries, I'll start by claiming Binder's "Judgment Sun" the highest ranking story in the April issue, which issue is certainly the best to date. There has, to my way of thinking, been a marked improvement with each number. The high spot in this month's is the better grade of paper, which should be a part of all magazines worth saving.

I usually refrain from coming right out and saying I don't like something, but I really do not care for "Zarnak."

Zagat's last story didn't quite go over with me. His "Lanson Screen" was very good and "Lost in Time," which is scheduled for next month, promises to be another just as interesting. I'm glad to see that Binder is returning too; I can't get enough of his stories. I'm looking forward to your next issue.—1745 Kenneth Rd., Glendale, Calif.

(Continued on page 120)

(Continued from page 119)

CORRESPONDENTS WANTED

By S. B. Fine

I am interested in chemistry and have been a regular subscriber of T. W.S. for almost two years. This is my first letter to you. T. W. S. is leaps ahead of any other science fiction book. I think the interior illustrations are somewhat mechanical and artificial—would like to see them more animated. The cover illustrations, though, are superb. Let us have some reprints of Weinbaum's earlier stories. I thoroughly enjoyed his "The Brink of Infinity." I was attracted by the new feature on scientific oddities. Keep up the good work. And how about giving "Zarnak" a bit of a rest? Don't you think he gives the magazine a juvenile tone?

Before I end, I would like to add that I am eager to hear from correspondents in foreign countries, principally America.—60 Hillbroud St., Berea, Johannesburg, S. Africa.

WHY WE RATE

By Robert Brower

THRILLING WONDER STORIES, in its one year of existence, rates with me as the best science fiction magazine being published today. And here's why: The stories are all by recognized leaders in the field. These men write good stuff consistently. The stories are all diversified, of every classification—biological, astronomical, interplanetary, time-traveling, etc. And what's more, they're snappy and complete. You've demonstrated that a science fiction story can be exciting; that it can be dignified even though it is not cluttered up with dull pseudo-scientific passages.

You have more features than any other magazine, better artists, and sell for the lowest price. You're always trying to improve. Sometimes I wonder how you can do it—there is no model for you to emulate—yet the mag keeps getting better and better.

And thanks for bringing back the old masters to science fiction—such men like A. Merritt, Otis A. Kline, Arthur J. Burks, Ray Cummings and Ralph Milne Farley.—Purling, Greene County, N. Y.

WEINBAUM'S GREATEST STORY

By Norman F. Stanley

Since you seem to be collecting first letters, here is another to add to the stack. As a reader of the old Wonder Stories since the very first issue, I was naturally pleased to see it reappear on the newsstands. The departure under the present management from the former rigid editorial policy has given THRILLING WONDER STORIES the appeal that the original magazine had all but lost.

The fiction content of the magazine is excellent both as to quality and quantity. I particularly enjoy those stories which, though serious in theme, have a slight humorous touch to the narration. Accordingly, I appreciate such yarns as "The Revenge of the Robot," "Liquid Life," and "Brain-Stealers of Mars." On the other hand among the more serious opuses I nominate "The Lanson Screen" and "The Circle of Zero." I must, however, put in an extra word of praise for the latter story. Opinions may differ, but I contend here and now that T. W. S. has published Stanley G. Weinbaum's greatest story. To be truthful, "The Circle of Zero" may not boast the brilliant interplay of ideas so characteristic of Weinbaum's tales, but the beauty and powerful simplicity of the tale can never be equalled in science fiction. To say that I was profoundly affected by it is but a trite sentiment; let it suffice that I have read and re-read this story and shall do so many times in the future.

But to get on. Your line-up for future issues, too, looks extremely promising. I hope that "Penton and Blake" will put in their appearance regularly between the covers of T. W. S. John W's breezy style is refreshing to say the least! It need hardly be said that I look forward with pleasure to renewing my acquaintance with Ray Cummings' "Tubby." Let's hope he hasn't forgotten the erudite Sir Isaac and the marvelous (but alas, unscientific) wishing power.

Re "Zarnak"; the strip started off very well, but I must agree with others that it is rapidly degenerating into the juvenile antics of a musclebound superhero. This latter sort of stuff may be all right in the Sunday comics but it is decidedly out of place in a respectable science fiction magazine. However, to say that "Zarnak" is absolutely worthless and should be eliminated is another matter. As it stands I should call it barely passable. Plaisted should pay more attention to details; his lack of consistency in the costumes and facial expressions of his characters is, to me, actually painful. But there's no reason why "Zarnak" should not mend his ways; the first two installments were GOOD.

In any event, don't abandon the cartoon strip idea altogether. An extended outline of future "history" somewhat along the line of the first installment of "Zarnak" would provide an excellent subject for one. Binder's "If!" is very good. T. W. S. improves with every issue. Keep up the good work.—43A Broad Street, Rockland, Maine.

REVIEWING THE YEAR

By Joseph Hatch

I'm telling you—

A year ago Wonder needed something—and bad! Today Wonder doesn't need much to make it the tops, the cream of the crop, and then some. A year ago Wonder occupied a permanent place upon the magazine rack. Today, sayeth I to the newsmonger: "Thou hast no THRILLING WONDER STORIES." Sayeth he: "I didst sold my stock, quite."

A. Merritt, Ray Cummings, Arthur J. Burks, etc. What a line-up of dearly beloved old-timers. And brought to us through the courtesy of the new and greater Wonder. Thanks. I speak in terms of gratitude raised to the nth power. But there's always tomorrow.

And what will tomorrow bring? Will you kindly delete "Zarnak?" Will you enlarge "If"? Will you induce Doc Keller to write something? And bribe A. Merritt into writing some more shorts or novelettes? And go monthly, by all means?

The May-June issue rates thunderous applause from cover to cover. Your cover artist is superb. Contemplation of all six past covers should leave anyone breathless.

The contents—"Lost in Time" is lost to view in its own smoke, it's that good. "The Black Vortex" runs a close second, so close, in fact, the difference would be imperceptible to even an "eye in the sky." "If!" is original, comprehensive, entertaining, and educational. If you must have a cartoon strip let it be "If!" And enlarge it by two pages. The announcement that "Tubby" will return deserves orchids. Remember "Around the Universe" and "The Thought Machine"? Okay, Mr. Cummings, let's go!—334 Maiden Lane, Lawrence, Kansas.

A SUPER-ISSUE

By T. Bruce Yerke

C'EST MAGNIFIQUE! Man, oh man, what an issue! The June issue of T. W. S. was without a doubt the best issue put out since Thrilling Publications took over. Cover: super! Stories: ultra-super! Pictures: super! You're going places mighty fast.

Until this issue "Protoplasmic Station" was the best story. Now I say that "Chessboard of Mars" by Eando Binder has gained the title. Next would come "Menace From the Microcosm," by John Russell Fearn. "Green Hell" was a little gem: VIVE Barnes! Also I don't hesitate to give "Dark Sun" a prominent place in the issue. Gallun's doing fine.

Say! Did A. J. Burks give us a surprise! I was there the night that he was at Chapter 4, and I'm sure all the Chapter members enjoyed the talk plenty. The idea given to him about traveling back into time seemed to interest him quite a bit. It was a fascinating theory, we discussed. Needless to say you could also go ahead into the past by using the same theory. I hope Mr. Burks can do something with the idea.—157 N. Alexandria Ave., Los Angeles, Calif.

NEXT ISSUE

A COMET PASSES

An Astronomical Novelette

By EANDO BINDER

The SCIENCE FICTION LEAGUE

A department conducted for members of the international SCIENCE FICTION LEAGUE in the interest of science fiction and its promotion. We urge members to contribute any items of interest that they believe will be of value to the organization.

EXECUTIVE DIRECTORS

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EANDO BINDER
JACK DARROW
EDMOND HAMILTON
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RALPH MILNE FARLEY
WILLIS CONOVER, JR.

THE total eclipse of the sun this June is a subject for the special attention of the world's astronomers, since it may well result in the discovery of a tenth planet. Astronomers have long suspected the existence of a tenth planet either beyond Pluto, or between Mercury and the Sun. The total eclipse this year will present certain favorable conditions that may reveal this long-sought-after heavenly body.

The greatest of astronomical events, the discovery of a new planet, has occurred three times since 1781. These planets are Uranus, discovered by Sir William Herschel; Neptune, discovered by the combined efforts of Leverrier of France and Adams of England; and Pluto, discovered by a search based on the mathematical calculations of Professor Percival Lowell.

AN ACCIDENTAL FIND

Uranus was discovered by accident. While trying out a new telescope Herschel was surprised to find a strange new planet appear in his range of vision. It was far out beyond Saturn, which from time immemorial had been assumed to be the outermost planet of all. That was the first real discovery of a planet.

Noting peculiarities in the orbit of Uranus, two young astronomers, Leverrier and Adams, came to the conclusion that the disturbance was caused by a new planet situated at a further distance from the sun. Working independently of each other, both were able to discover the new planet, later named Neptune, in 1846.

THE SEARCH FOR PLUTO

But the disturbances in the orbit of Uranus were not fully explained by the discovery of Neptune, and astronomers began searching for a new planet even further from the sun. Prominent among them were Percival Lowell and W. H. Pickering, two of America's greatest astronomers. When Lowell died, the Lowell Observatory, using the figures of Prof. Lowell, took up the search where he left off. Their quest was crowned with success, and a new planet, now known as Pluto, was discovered in January, 1930.

Though science has probably discovered all the planets in our Solar System, conjecture is still open concerning the habitability of the different worlds. In next month's issue, Arthur K. Barnes presents stimulating theories concerning the probable environment of the planet Venus in his exciting novelette, THE HOTHOUSE PLANET. Astronomers tell us that Venus is, in all eventuality, a steaming jungle. Mr. Barnes, in his story, pictures the strange life adaptable to such physical conditions.

PENTON AND BLAKE

Also, in the next issue, John W.

Campbell, Jr., continues his blithe account of those two gay space-rovers, Penton and Blake, in a new novelette, of the satellite Callisto, THE IMMORTALITY-SEEKERS. It's the best story so far of the entire series, and will introduce you to a new character, "Pipeline." The strange automobiles encountered on Ganymede by Penton and Blake in this month's story are met again on Callisto. You'll be surprised when you learn the secret of the "musclemobiles."

In addition to many other complete novelettes and short stories, next month sees the return of one of science fiction's most memorable characters—Ray Cummings' humorous scientific adventurer, portly Tubby. Don't miss the first of Tubby's new experiments, THE SPACE-TIME-SIZE MACHINE.

Join the SCIENCE FICTION LEAGUE! It's an international organization of the world's most enthusiastic followers of imaginative fiction—and it fosters that intangible bond between all science fiction readers. Just fill out the membership application blank provided on Page 125. There are members and chapters in every part of the globe—there are interesting get-togethers between members.

To obtain a FREE certificate of membership, tear off the name-strip of the cover of this magazine, so that the date and the title of the magazine show, and send it to SCIENCE FICTION LEAGUE, enclosing a stamped, self-addressed envelope. We will forward you, in addition to the certificate, further information concerning LEAGUE activities. And readers—write the editor of THRILLING WONDER STORIES a regular monthly letter. What kind of stories do you want, what authors are your favorites, what do you think of our departments, artists and covers? We want all your suggestions and criticisms.

THE SCIENCE FICTION LEAGUE

—a department conducted for members of the international Science Fiction League in the interest of science, science fiction and its promotion. We urge members to contribute any items of interest that they believe will be of value to the organization.

There are thousands of members in the League with about forty chapters in this country and abroad, and more than that number in the making all over the world. An application coupon for readers who have not yet joined will be found in this department.

(Continued on page 124)

(Continued from page 123)

FOREIGN CHAPTERS

Leeds Science Fiction League (Chapter No. 17). Director, Douglas W. F. Mayer, 20 Hollin Park Rd., Roundhay, Leeds 8, Yorkshire, England.

Belfast Science Fiction League (Chapter No. 20). Director, Hugh C. Carswell, 6 Selina St., Belfast, Northern Ireland.

Nuneaton Science Fiction League (Chapter No. 22). Director M. K. Hanson, % Mrs. Brice, Main Road, Narborough, Leicestershire, England.

Sydney Science Fiction League (Chapter No. 27). Director, W. J. J. Osland, 26 Union Street, Paddington, Sydney, N.S.W., Australia.

Glasgow Science Fiction League (Chapter No. 34). Director, Donald G. MacRae, 36 Moray Pl., Glasgow, Scotland.

Barnsley Science Fiction League (Chapter No. 37). Director, Jack Beaumont, 30 Pontefract Road, Barnsley, Yorkshire, England.

OTHER CHAPTERS

There are other domestic Chapters of the LEAGUE, fully organized with regular meetings, in the following cities. Addresses will be furnished upon request by Headquarters to members who would like to join some local branch. Chapters are listed chronologically according to Charter:

Lewiston, Ida.; Erie, Pa.; Los Angeles, Calif.; Monticello, N. Y.; Mayfield, Pa.; Lehanon, Pa.; Jersey City, N. J.; Lincoln, Nebraska; New York, N. Y.; Philadelphia, Pa.; Oakland, Calif.; Elizabeth, N. J.; Chicago, Ill.; Tacoma, Wash.; Austin, Tex.; Millheim, Pa.; Bloomington, Ill.; Newark, N. J.; Stamford, Conn.; Denver, Colo.; Lakeport, Calif.; Ridgewood, N. Y.; Woodmere, N. Y.; Beckley, W. Va.; Tuckahoe, N. Y.; South Amboy, N. J.; Pierre, S. Dak.; Albany, N. Y.; and Boonton, N. J.

THE GREATER NEW YORK CHAPTER OF THE SCIENCE FICTION LEAGUE

This branch has been holding meetings approximately once a month, the date usually determined by the accessibility of a clubroom. Several members have become inactive, while several more new persons have entered the branch.

Nearly all copy for the branch organ, **The Cosmic Call** is in, and publication is expected to occur almost immediately. It was decided that the organ would be mimeographed and sold for fifteen cents per copy. Reciprocal subscriptions with any other fan or club magazine are invited.

A theater party to see "The Man Who Could Work Miracles" was called off, due to the fact that the science fiction convention fell on the same weekend as the picture's premiere. Efforts are being made to write a comparative history of stf-films, for inclusion in **The Cosmic Call.**

All S.F.L. members resident in Greater New York and desirous of joining the chapter are requested to communicate with the Director at 677 Lincoln Place, Brooklyn.

THE SECOND EASTERN SCIENCE FICTION CONVENTION

Last February 21st the New York Branch of the International Scientific Association sponsored a convention of science fiction fans, the second of what is expected to be an annual series. Half a hundred fans from all over the Atlantic seaboard converged in New York; among them, Otis and Allen Kline, Manly Wade Wellman, Mort Weisinger, Charles D. Hornig, Otto Binder, and other prominent authors, editors, and fans.

Talks were given, motion pictures were shown, and those present agreed that the meeting had done much to cement fellowship between the various factions of science fiction. It was decided that an attempt be made to hold a World Convention in connection with the 1939 New York World's Fair. (Persons wishing to attend this, or desirous of securing further information on the Convention of this year, are requested to communicate with either Donald A. Wollheim, 801 West End Avenue, N. Y. C., or William S. Sykora, 31-51 41st Street, Long Island City, N. Y.)

The whole convention spread over three days, but all business was transacted on Sunday, the other two days being used for "Get-Acquainted" gatherings and inspection of the city on the part of out-of-town delegates.

FLUSHING CHAPTER

James V. Taurasi, 137-07 32 Avenue, Flushing, New York, writes to inform us that he has formed a Chapter of the Science Fiction League for science fiction enthusiasts living in his vicinity. All those interested in cooperating with Mr. Taurasi should get in touch with him soon at his address.

LEEDS CHAPTER

The Leeds Chapter, No. 17, has experienced a change in directorship, and Mr. Mayer, the former director, has been succeeded by Mr. Gottlife. The new Headquarters address is 4 Grange Terrace, Chapeltown, Leeds 7, England.

NEW MEMBERS

UNITED STATES

Frank A. Kreml, Jr., 1525 Sutter St., San Francisco, Cal.; E. L. Grundel, 2810 Leeward Ave., Los Angeles, Cal.; Donald Price, 2912 Clifton Ave., Baltimore, Md.; A. H. Rogers, 1349 S. Main, Carthage, Mo.; Jack Lowe, Box 715, Willowbrook, Cal.; Robert Larkin, 42 Church St., Nassau, N. Y.; Thomas Condon, 90 Oliver St., Derby, Conn.; Douglas Sheeley, 301-23rd St., Denver, Colo.; Bernard Kramer, 1329 Locust St., Pittsburgh, Pa.; Vernon Crist, 1005 W. Barre St., Baltimore, Md.,; Claude D. Wymer, 334 S. Dewight St.; Jackson, Michigan; Frank Vernarsky, 701 Maple St., Warren, Ohio; J. M. Rosshopf, 3315 Elmley Ave., Baltimore, Md.; Sidney Kauffman, 24 W. 2nd Ave., Denver, Colo.; David Hein, 2009 Creston Ave, Pleasantville, N. Y.; Wm. MacFarlane, Jr., 24 Chestnut St., Mount Vernon, N. Y.; F. Lane, 79 Beacon Ave., Jersey City, N. J.; William Visser, 40 Gregg St., S. W., Grand Rapids, Michigan; George Reahm, 58 Ridge Ave., Phoenixville, Pa.; John R. Huish, 2372 Lake St., Salt Lake City, Utah; R. D. Richardson, Box 2223, Juneau, Alaska; A. Silverstadt, 1060 Union St., Brooklyn, N. Y.; Theo. Manheim, 2739 Glenwood Ave., Philadelphia, Pa.; R. R. Winterbotham, 99 East Washington, Pittsburgh, Kan.; Robert B. Dubrow, 116-46 Sutpkin Blvd., South Ozone Park, N. Y.; Frederick Jones, 8 Highland Ave., Middletown, N. Y.

Geo. Winesdoerffer, 630 National Rd., Wheeling, W. Va., Edmund McCarthy, 859 Jackson Ave., N. Y., N. Y.; George Kramer, 1506A So. 35 St., Milwaukee, Wisc.; Stanley Hansen, Box 35, Millbrook, N. Y.; Joseph Lewandowski, 4882 East 95 St., Garfield Hgts., Ohio; Kenneth Dawson, Route 2, Wakarusa, Kansas; Joel Duckett, 6820½ So. Vermont Ave., Los Angeles, Cal.; J. Kruger, 1270 Pacific St., Brooklyn, N. Y.; Bernard F. Crone, 1223 3rd St., Portsmouth, Ohio; Clifton Nix, 186 Minerva St., Jackson, Miss.; Joe Lesscsynski, 3530 E. Willis, Detroit, Mich.; R. H. Turini, 4 Church St., Hillsboro, New Hampshire; Joseph Serpico, 816 Payne Ave.; Saint Paul, Minn.; Spencer Crilly, 1968 Midwick Dr., Altadena, Cal.; Russert Chugley, Box 328, Monticello, N. Y.; Neil Randall, 248½ 29th St., Ogden, Utah; Richard Kern, Barddock Hts., Md.; Conrad Weathersby, Box 125, Nixon, Texas; Jack Rhinehart, 1230 Carrollton, Indianapolis, Ind.; George Weston, Pennell St., Skowhegan, Me.; Frank P. Holby, 133 Noe St., San Francisco, Cal.; Roy Dunham, 1800 S. Maple, Carthage, Mo.; Bill Campbell, 1046 Garrison St., Carthage, Mo.; A. H. Rogers, 1349 S. Main, Carthage, Mo.

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lyn, N. Y.; Melvin Lloyd, R. D. 2, Box 20A, Portage, Pa.; James Autry, 602 North 23 St., Corsicana, Texas.

S. Kapetansky, 1524 Taylor, Detroit, Michigan; B. R. Reagan, 10th Ordnance Service Co., Langley Field, Va.; Emanuel Alexander, 15 E. Center St., Baltimore, Md.; Eddie Finn, Jr., 67 Jefferson Ave., New London, Conn.; Adolph Sidora, 8 Bank St., Paterson, N. J.; Robert Areolere, 3208 Boulevard, Jersey City, N. J.; R. Morris, Box 144, Gratis, Ohio; Ralph C. Eislebeu, 305 Quincy St., Brooklyn, N. Y.; James R. Hantze, P. O. Box 53, West Point, N. Y.; James R. McAlary, 402 Hope St., Providence, R. I.; John Giunta, 1355-80 St., Brooklyn, N. Y.; Roy P. Reisch, 138 Union St., Millersburg, Pa.; Alan Brown, 2549 N. Monitor Ave., Chicago, Ill.; J. J. Mayer, 400 E. 29th St., N. Y. C.; Alex Osheroff, 478 18th Ave., Newark, N. J.; Carl R. Seward, Appleton City, Mo.

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8—37

THE SCIENCE FICTION LEAGUE

(Continued from page 125)

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GUIDE TO SCIENCE KNOWLEDGE ANSWERS

(See Page 71)

1—Page 26 in THE IRON WORLD.
2—Page 32 in THE CONQUEST OF LIFE.
3—Page 32 in CONQUEST OF LIFE.
4—Page 56 in THE DOUBLE MINDS.
5—Page 76 in ROUND ABOUT RIGEL.
6—Page 93 in SPACEWARD.
7—Page 94 in SPACEWARD.
8—Page 89 in VISION OF THE HYDRA.
9—Page 102 in RIFT IN INFINITY.

FORECAST FOR THE NEXT ISSUE

A COMET PASSES, by EANDO BINDER, in next month's issue, presents a dramatic theme based on astronomy! The influence of Halley's great comet on all civilizations, past, present, and future! Throughout the ages—from the time of the dawn-men, to generations thousands of centuries later, a comet blazes its incandescent trail of glory through the star-studded heavens—with surprising results!

* * *

JOHN W. CAMPBELL, JR., continues the adventures of his two dauntless space-rovers, Messrs. Penton and Blake, in a new novelette of scientific explorations on Callisto. Campbell's story, THE IMMORTALITY-SEEKERS, describes the strange science of a race to whom the secret of fire is unknown. Even stranger than the *thushol* and the *shleath* is the unusual form of alien life they encounter this time—"Pipeline." It's the best so far of this popular series.

* * *

THE fascinating riddle of a hole in the cosmos, and of a strange ether-eddy that alters space-time, furnishes the subject for THE CAVERN OF THE SHINING POOL, an exciting novelette of an adventure in Einsteinian relativity, by ARTHUR L. ZAGAT. The story contains a brand new idea and packs a wallop that will make you remember this tale for a long, long time.

* * *

THE HOTHOUSE PLANET, a novelette of life on Venus, by ARTHUR K. BARNES, introduces Gerry Carlyle, a female Frank Buck of the future! Read the story of what happens when the little lady hunts for the *Murri*—something that can't be brought back—alive!

In addition to all these novelettes, next month's issue of THRILLING WONDER STORIES brings back a famous science fiction character—RAY CUMMINGS' "Tubby," in a short story, THE SPACE-TIME-SIZE MACHINE. Also, many other stories by your favorite writers.

Scientibook Review

MEN OF MATHEMATICS. By Eric Temple Bell. Simon and Schuster, 1937, at $5.00. Copiously illustrated.

SINCE the accomplishments of such men as Pasteur or Galileo and Newton's discovery of Gravity are more or less comprehensible to us, we understand better the importance of their work. Since the involved realms of high arithmetic and higher mathematics in general are so incomprehensible, few appreciate the immense value of the accomplishments of the men who have given ways to handle the higher functions. Perhaps as a consequence, few books have been written giving the ordinary, intelligent reader some appreciation of these men.

Eric Temple Bell, better known to us as John Taine, is Professor of Mathematics at California Institute of Technology, and at the same time an excellent writer, as science fictionists know. He has made interesting and understandable both the biography of the men he discusses, and the mathematical and wider scientific importance of their works. The book involves only sufficient mathematical language as is necessary to answer the question as to the type and value of the work each mathematician did, mathematics easily and clearly described, with the result that the work requires intelligence, but not learning, for its enjoyment.

Anecdotes (and mathematicians apparently inspire anecdotes) aid in lightening the straight biography. Naturally much of the material belongs in the category of "things I never knew before"; that arithmetic is far, far more difficult than algebra, and why. There are mysteries, too, puzzles raised and never yet solved, puzzles many of them more important than the ancient and hopeless, but persistently recurring squared circle. Fermat's Last Theorem, for instance; the proof that Fermat, the greatest of arithmeticians wrote of in 1637, that it was a "truly marvelous demonstration" of a theorem, a note in the margin of a book, a margin too narrow to contain the demonstration, that no one in the three hundred years since has been able to duplicate. The problem of prime numbers.

MEN OF MATHEMATICS is a book for the home library, a reference book to be read over a period of weeks, its 580 pages crowded with a mass of information.—

J. W. C.

THE STORY BEHIND THE STORY

(Concluded from page 10)

aginary as it appears to be offhand. Listen to what the author says about it:

The Idea behind the story, RIFT IN INFINITY, is, of course, obvious. Tbis has been a bad year for the airlines, particularly on the west coast. Many airliners have crashed, with consequent fatalities. With one exception they have not mysteriously disappeared. Their wreckage has been found. And the reason for the crashes seems to be the simple one of the failure of beacons and signals. But it was easy to go on from the fatalities and imagine that the planes had not crashed, but had mysteriously disappeared. How could that happen?

Well, space is presumed to be curved. That would bring the infinite end of space around a great circle to a point adjacent to its beginning. Suppose space buckled a little, or warped. That might engulf an object, in a fraction of a second, in the outermost reaches of space. I placed my vanished west coast plane in that plight—and the result was the story.

ELIXIR OF YOUTH

CONQUEST OF LIFE, by EANDO BINDER, is based on the radiogen theory of life. How Mr. Binder's hero makes use of this knowledge in his search for the secret of eternal youth makes fascinating reading. Here's what Mr. Binder has to say about this theme:

An article in a recent issue of Harper's was the inspiration for CONQUEST OF LIFE. The article, brought to notice by a friend, speculated as to longevity factors in animal lifs, and suggested tbat some of these factors might be artificially changed in the great equation of Life—to give an end-product of increased life-span.

Allowing my thoughts to wander from science to pseudo-science, I indulgsd in a bit of imaginative ciphering. Witb the flexibie terms of cosmic radiation, Crile's electrical analysis of living matter, and science fiction's unlimited grab-bag of scientific twists, an equation came out that bad one end waving in infinity.

There is the tail that wagged the dog. This end sticking out beyond reach wagged the story for some time before it could be anchored down.

I rather like Crile's definition of life in volts and amperes and things electrical. It hooks up so admirably with the Universe at largs, wbich is ultimately reducible to electrons, protons, neutrons, and other unit particles of an electric nature.

Living matter is simply aggregations of tbess snergetic particles which have combined in a peculiar fashion to exbibit the phenomena of growth, reproduction, and thought. If ws go on to assume that thought is purely electrical—which is logical—we find no mystery to life at all, except the particuiar arrangement resulting in its manifestation.

The span of life—its boundaries between individual birth and death—may be simply an accumulative out-of-tuneness with the eternal Universe. And the answer to fixing the out-of-tuneness may be far simpler than the pretentious parade of medical science, biochemistry, and biology admits.

At any rate, so it is assumed for the sake of this story, and I hope I have presented the theme convincingly.

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